

Report on the second season (2009) of the Madâ'in Sâlih Archaeological Project

Prepared under the direction of L. Nehmé, D. al-Talhi and F. Villeneuve

With contributions by

A. al-ʿAnzi, Ch. Bouchaud, G. Charloux, N. Delhopital, C. Durand,
Z. T. Fiema, Y. Gerber, M. al-Hâjirî, S. Marion de Procé, M. al-Mutlaq
L. Nehmé, J. Rohmer, I. Sachet, D. al-Talhi, F. Villeneuve,
as well as plans and drawings by J. Humbert and S. Eliès



December 2009

Paris
December 2009

Report on the second season (2009)
of the Madâ'in Sâlih Archaeological Project

Prepared under the direction of L. Nehmé, D. al-Talhi and F. Villeneuve

With contributions by
A. al-'Anzi, Ch. Bouchaud, G. Charloux, N. Delhopital, C. Durand,
Z. T. Fiema, Y. Gerber, M. al-Hâjirî, S. Marion de Procé, M. al-Mutlaq
L. Nehmé, J. Rohmer, I. Sachet, D. al-Talhi, F. Villeneuve,
as well as plans and drawings by J. Humbert and S. Eliès

Table of contents

| | |
|---|--------|
| Introduction | p. 7 |
| Area 1, Residential Area Guillaume Charloux | p. 17 |
| Area 2, Trenches A and E, <i>Loci</i> 20000 and 24000, Residential Area Zbigniew T. Fiema | p. 43 |
| Area 2, Trenches C and F, <i>Loci</i> 22000 and 25000, Residential Area Jérôme Rohmer | p. 81 |
| Area 2, Trench D, <i>Loci</i> 23000, Residential Area Mahmoud al-Hâjirî | p. 115 |
| Research on the Rampart (<i>loci</i> 31000 and 34000), Area 3 François Villeneuve | p. 125 |
| Area 7, Residential Area Dhaifallah al-Talhi and Abdulhadi al-‘Anzi | p. 139 |
| Area 8, Residential Area Solène Marion de Procé | p. 149 |
| Monumental Tombs, Area 5 N. Delhopital and I. Sachet | p. 165 |
| Report on Various Trenches, Area 6 L. Nehmé | p. 217 |
| Restoration in Area 7, Residential Area Dhaifallah al-Talhi and Mutlaq al-Mutlaq | p. 245 |
| The Archaeobotanical Remains Ch. Bouchaud | p. 255 |
| Pottery Study Y. Gerber and C. Durand | p. 275 |
| Conclusion | p. 303 |
| Figures in A3 format | |

Introduction

L. Nehmé, D. al-Talhi et F. Villeneuve

Between the 12th January and the 28th February 2009, the archaeological project at Madâ'in Sâlih carried out its second season of excavations on the ancient site of Hegra, a medium-sized Nabataean town on the southern border of the Nabataean kingdom and later of the Roman province of Arabia (fig. 1). This season follows the first, on which a complete report was presented to the excavation committee in October 2008 and it has been turned into a publication (L. Nehmé, D. al-Talhi and F. Villeneuve (eds), *Hegra I. Report on the First Excavation Season at Madâ'in Sâlih, Saudia Arabia, 2008*. Riyadh, 2009).

Seven excavation areas were selected in 2009. They are presented below under the authorship of each area supervisor, and scientific coordination is ensured by the project directors. The order of presentation is as follows: residential area (areas 1, 2, 3, 7, 8), monumental tombs (area 5) and other trenches (area 6) (fig. 2).

As in 2008, the chapters below are a complete report on all the project's activities. It is presented to the *ministère des Affaires étrangères*, as well as to our umbrella organisations, our partners and to a certain number of French and foreign scholars who will thus be able to disseminate the results of the project's work throughout the academic world. But first and foremost, it is a working document for the team members and their future colleagues on the project and must, therefore, provide detailed and accurate information on the work carried out in the field. The existence of this report is a *sine qua non* for the success of future excavation seasons.

Acknowledgments

As each year, the directors of the project would like to thank all the institutions and people who helped make this second season a success:

- the Supreme Commission for Tourism and Antiquities in Riyadh (SCTA) ;
- *la Division des sciences sociales et de l'archéologie* of the *ministère des Affaires étrangères* in Paris;
- *l'Ambassade de France* in Riyadh and the *Consulat général de France* in Jeddah;

- the Saudi Arabian Embassy in Paris and its Cultural Bureau;
- the Archaeological Museum in al-‘Ulâ;
- l’UMR 8167 of the CNRS, *Orient & Méditerranée*, Ivry sur Seine;
- l’UMR 7041 of the CNRS, *Archéologie et Sciences de l’Antiquité*, Nanterre;
- the University of Paris 1;
- l’Institut français du Proche-Orient (IFPO);
- the Simone and Cino del Duca Foundation.

Grants from the Senate, Total and OTV Île de France were obtained in 2008 and are recalled here. They helped in the acquisition of materials and the preparation of publications.

The project directors would also like to thank the members of the Madâ’in Sâlih team for their professionalism, efficiency and co-operation. We would like to give particular thanks to Mr. Daniel Ollivier and Mr. Christian Couturaud of the *Service de coopération et d’action culturelle* (SCAC) of the *Ambassade de France* in Riyadh, and to Mr. Alain Marquer and Mr. Yann Gayet of the Jedda branch of the SCAC. Finally, we would like to express our warmest thanks to Mr. Mutlaq al-Mutlaq, our inspector and good friend, who solved all the daily problems of the project. Without him and all the others who helped us, the project could not have been organized in the way it was.

Affiliations, directors and participants

Affiliations

The project works under the aegis of the following bodies, to which its directors are affiliated and which evaluate its work:

- la *Division des sciences sociales et de l’archéologie* of the *ministère des Affaires étrangères* in Paris;
- l’UMR 8167, *Orient & Méditerranée*, (Ivry sur Seine); UMR 7041, *Archéologie et Sciences de l’Antiquité* (Nanterre).
- the Supreme Commission for Tourism and Antiquities, Riyadh.

Directors and participants

The project was directed by Daifallah al-Talhi, who was director of research at the Department of Antiquities in Riyadh and is now professor at the University of Hâ’il, by Laïla Nehmé, researcher at the CNRS in the *Orient & Méditerranée* section and by François Villeneuve, professor at the University of Paris 1. These three directors took it in turn to be on the site, so that at least one, or more usually two or even all three directors, would be present at the site so as to provide the best possible supervision of the work.

Twenty-two people, whose names and roles are presented in the table below, participated in the 2009 season:

| <i>SURNAME First name</i> | <i>Nationality</i> | <i>Institutional affiliation</i> | <i>Role</i> | <i>Work on the project</i> |
|---------------------------|--------------------|--|--|--|
| <i>al-‘Anzi Abdulhâdi</i> | Saudi | al-‘Ulâ Museum | archaeologist | area 7 and restoration |
| Augé Christian | French | director of research at the CNRS | numismatist | study of the coins |
| Bernel François | French | engineer, IFPO Damascus | conservator of metal objects | conservation |
| Bonnot-Diconne Céline | French | Centr’ALP | leather conservator | conservation |
| Bouchaud Charlène | French | PhD student at the University of Paris I (archaeobotanical laboratory of the UMR 7041) | specialist in archaeobotanical remains | analysis of the archaeobotanical remains |
| Charloux Guillaume | French | research engineer at the CNRS | archaeologist | area 1 |
| Dal-Prà Patricia | French | Heritage school | textile conservator | conservation |
| Delhopital Nathalie | French | University of Bordeaux I | anthropologist | area 5 |
| Durand Caroline | French | post-doctoral research, University of Lyon II | ceramicist | ceramic analysis |
| Eliès Sylvie | French | CNRS | draughtsperson | drawing (ceramics and objects) |
| Fiema Zbigniew | Polish | Academy of Finland | archaeologist | area 2 |
| Gaiani Serge | French | retired | camp manager | administration, photography of objects |
| Gerber Yvonne | Swiss | PhD student at the University of Basel | ceramicist | ceramic analysis |
| <i>al-Hâjirî Mahmoud</i> | Saudi | Dammam Museum | archaeologist | area 2 |
| Humbert Jean | French | IFPO | draughtsman | field drawings |
| Marion de Procé Solène | French | PhD student at the University of Paris 1 | archaeologist | area 8 |
| <i>al-Mutlaq Mutlaq</i> | Saudi | assistant director of the al-‘Ulâ Museum | archaeologist | conservation |
| Nehmé Laïla | French | researcher at the CNRS | archaeologist | area 6 |
| Rohmer Jérôme | French | PhD student at the University of Paris 1, ATER | archaeologist | area 2 |
| Sachet Isabelle | French | post-doctoral research (ANR) | archaeologist | area 5 |
| <i>al-Talhi Daifallah</i> | Saudi | Saudi Commission for Tourism and Antiquities | archaeologist | director, area 7 and conservation |
| Villeneuve François | French | professor at the University of Paris 1 | archaeologist | director, area 3 |

In addition, two archaeologists from Bahrein, Mohammad Ja‘far ‘Îsa and ‘Abbâs Ahmad Salmân, were welcomed by the project for a week’s training between 20/02 and 27/02/2009.

Four participants belong to the Saudi Commission for Tourism and Antiquities (al-‘Ulâ and Dammam Museums) and sixteen from various research institutions in France and Europe, two of which were not French (the Academy of Finland and University of Basel). Two persons are affiliated to the *Institut français du Proche-Orient* (F. Bernel and J. Humbert). There were students from the Universities of Paris 1 (Ch. Bouchaud, S. Marion de Procé, J. Rohmer) and Bordeaux I (N. Delhopital). The CNRS provided two researchers (Chr. Augé and L. Nehmé) and two engineers (G. Charloux and S. Eliès) and the University of Paris 1, one professor (F. Villeneuve). Finally, in 2009, the project was joined by two professional conservators, P. Dal-Prà for textiles and C. Bonnot-Diconne for leather.

Financing and partnerships, 2009 season

Financing for the project were provided by contributions from both the public and private sectors as follows:

Public Partners

- *le ministère des Affaires étrangères* (government grant);
- *l'Ambassade de France in Riyadh* (government grant);
- the Saudi Arabian Embassy in Paris (logistical support, visas)
- *l'UMR 8167, Orient & Méditerranée* and *UMR 7041, Archéologie et Sciences de l'Antiquité* (individual missions)
- *l'Institut français du Proche-Orient* (availability of personnel);
- the Saudi Commission for Antiquities and Museums (help in kind).

Private Partners

French firms:

For the publication of the monumental tombs: OTV Île de France (Veolia Eau).

For the purchase of equipment only (not for field work): 2008 grant from Total.

Prizes

2008: the project won the Grand prize for archaeology of the Simone and Cino del Duca Foundation.

In the future, we will still rely heavily on contributions from the *ministère des Affaires étrangères*, which has long been interested in the excavation project at this major site. This contribution is the only regular one and also provides a source of legitimacy to our work in Saudi Arabia. Equally, the support of the *Ambassade de France* in Riyadh is essential for our field work to take place.

Practical aspects

Cars

The project rented three cars in Jeddah from a private rental agency and also had the benefit of a car and driver made available by the Department of Antiquities. The presence of the driver was much appreciated, particularly for the transfer of team members between Jeddah, Medina or al-Wajh, and al-'Ulâ and vice versa.

Lodging

The team was once again housed in the flat next to the Museum of al-'Ulâ. A pre-fabricated building of three rooms with bathrooms was purchased and set up near to the Museum, on land belonging to it. The two buildings were able to house all the team members. For the first time, the project was also able to use all the work spaces in the museum, notably the laboratories, where the finds were registered, studied, drawn and conserved. Given that the project is now

well established in the Museum facilities, where it also benefits from large storage spaces, a move to the buildings of the Hijâz station that are currently being renovated on the site itself is not desirable in the project's current four-year framework.

Security

The Saudi security services (general security, traffic police, etc.) ensured discrete and effective full-time protection of the team members, both by the presence, day and night, of a military guard at the Museum and by a systematic motorised escort of all team members travelling by car, whether in town or for longer journeys.

Publications

The publication of a volume devoted to the necropolises of the site has progressed well in 2009. Most of the chapters are nearly finished and, with the exception of the maps, the catalogue and plates are ready.

A 350-page volume (in English) presenting the work of the first season is forthcoming. It was produced and designed in Paris and the Saudi Commission for Antiquities and Museums has taken care of the printing, in colour, in Riyadh.

Some articles in French (in the *Comptes rendus de l'Académie des inscriptions et belles-Lettres*) and in Arabic (in *Atlat*) are also forthcoming.

Finally, the directors of the project are contributing to a chapter in the catalogue of an exhibition on Arabia which will take place in the Louvre from July to September 2010 (manuscripts due in January 2010).

Conference papers and presentations

In January 2009, Laïla Nehmé gave a lecture on Madâ'in Sâlih at the *Ambassade de France* in Riyadh and at the *Consulat général de France* in Jedda.

A journalist from the *Figaro Magazine*, Martine Betti-Cusso, and an agency photographer, Hubert Raguet, spent one week on the site during the season to prepare a six-page report which was published in June 2009 ("Hégra, l'autre Pétra", p. 60-65).

Link: <http://www.lefigaro.fr/voyages/2009/06/27/03007-20090627ARTFIG00106--l-autre-petra-.php>

The publication of this article led to a second one, in the Danish magazine *Illustreret Videnskab*. Finally, in October 2009, we were approached for a similar article by journalists of the American magazine *Archaeology*.

Many people visited the site during the season: Mr. Peter Brabeck, CEO of Nestlé, his wife and some friends, spent a day on the site and were given a booklet on the work of the project. The Finnish Ambassador to Saudi Arabia, Mr. Martti Isoaro, the Consul General of France in Djedda, Mr. Christian Nakhlé, and Mrs. Lama Soulayman also spent a day on the site. Finally, a group of French expatriots, including several members of the Embassy, spent a weekend in al-'Ulâ. All these people were welcomed by the team and were offered a complete tour of the site.

Restoration

The project endeavoured to restore and present the previous excavations carried out by the Saudi Department of Antiquities, as well as to carry out some conservation and restoration trials on newly exposed stone and mudbrick walls. Following this work, some restoration and presentation was also carried out in 2009. In addition, some new mudbricks were made during the season and placed on a few walls.

The presence of C. Bonnot-Diconne and P. Dal-Prà meant that the leather objects and textiles from the tomb excavation could be conserved.

Training

In 2009, the project welcomed several PhD students and post-doctoral researchers.

Charlène Bouchaud: preparing a thesis at the University of Paris 1;

Nathalie Delhopital: preparing a thesis at the University of Bordeaux I;

Yvonne Gerber: finishing a thesis at the University of Basel (Switzerland);

Solène Marion de Procé: preparing a thesis at the University of Paris 1;

Jérôme Rohmer: finishing a thesis at the University of Paris 1;

Note : Charlène Bouchaud and Nathalie Delhopital have the official agreement from the Saudi authorities to use the data from the excavation for their theses.

Post-doctoral researchers:

Caroline Durand

Isabelle Sachet: post-doc French National Research Agency (ANR).

Work carried out in 2009

As with the first season, the trenches were not limited to the residential area, but were in several sectors of the town: the urban centre (areas 1, 2, 3, 7 and 8), the monumental tombs (area 5), and three isolated structures (area 6 subdivided into 60200, 60300 and 60400) (see fig. 2).

Some were trenches that had been started in 2008 and continued in 2009; namely areas 1, 2 and 3 of the residential area (figs 3 and 4) and tomb IGN 117 in area 5.

Areas 1 and 2 are the two large trenches in the urban centre (see the reports by G. Charloux, Z. T. Fiema, J. Rohmer and M. al-Hâjirî) and they brought to light domestic structures dated from the 1st century BC to the beginning of the Islamic period.

Area 3, or the “northwest Tell”, at the northwest corner of the town’s rampart, contains the rampart itself as well as structures backing onto it (see F. Villeneuve’s report).

Area 7 is an eastward extension of excavation square I22, opened in the excavations of 1986-1990 by D. al-Talhi (see the report by D. al-Talhi and A. al-‘Anzi).

As for **area 8**, it contains the remains of a large building, found both by geophysical detection and surface traces. These consist of the upper surface of three sandstone column drums and the upper, rectangular surface of a very large ashlar block, oriented north-south, which were mentioned in the 2008 report (see the introduction to that report “A large monument with columns near the centre of the residential area?”). It was possible to remove the surface layer from this building in 2009 (see the report by S. Marion de Procé).

Outside the residential area, excavation continued in the monumental façade tomb IGN 117 (**area 5**). The abundance of finds (bones, as well as leather and textiles) and the difficulty of excavation (the need to dig from *above* the trench, from scaffolding put up inside the burial chamber, the use of a vacuum cleaner, etc.), meant that it has not been possible to complete the excavation of this tomb in two seasons.

In **Area 6** three trenches on isolated structures were excavated, some very rapid and limited to verifications: one in the middle of a series of column drums (60200, Ith 105), another in a circular structure that dominated the landscape located at the foot of a sanctuary (60300, Ith 68) and lastly in a structure that was originally interpreted as a tomb, located between the Qasr al-Bint and the enclosure around the residential area (60400, QB 6). For these trenches, see the report by L. Nehmé.



Fig. 1. Location of site

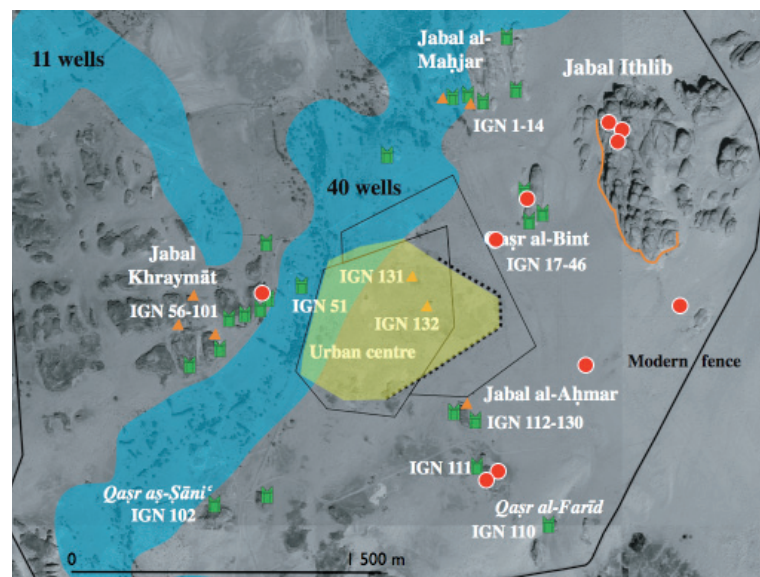


Fig. 2. Areas excavated in 2008 and 2009

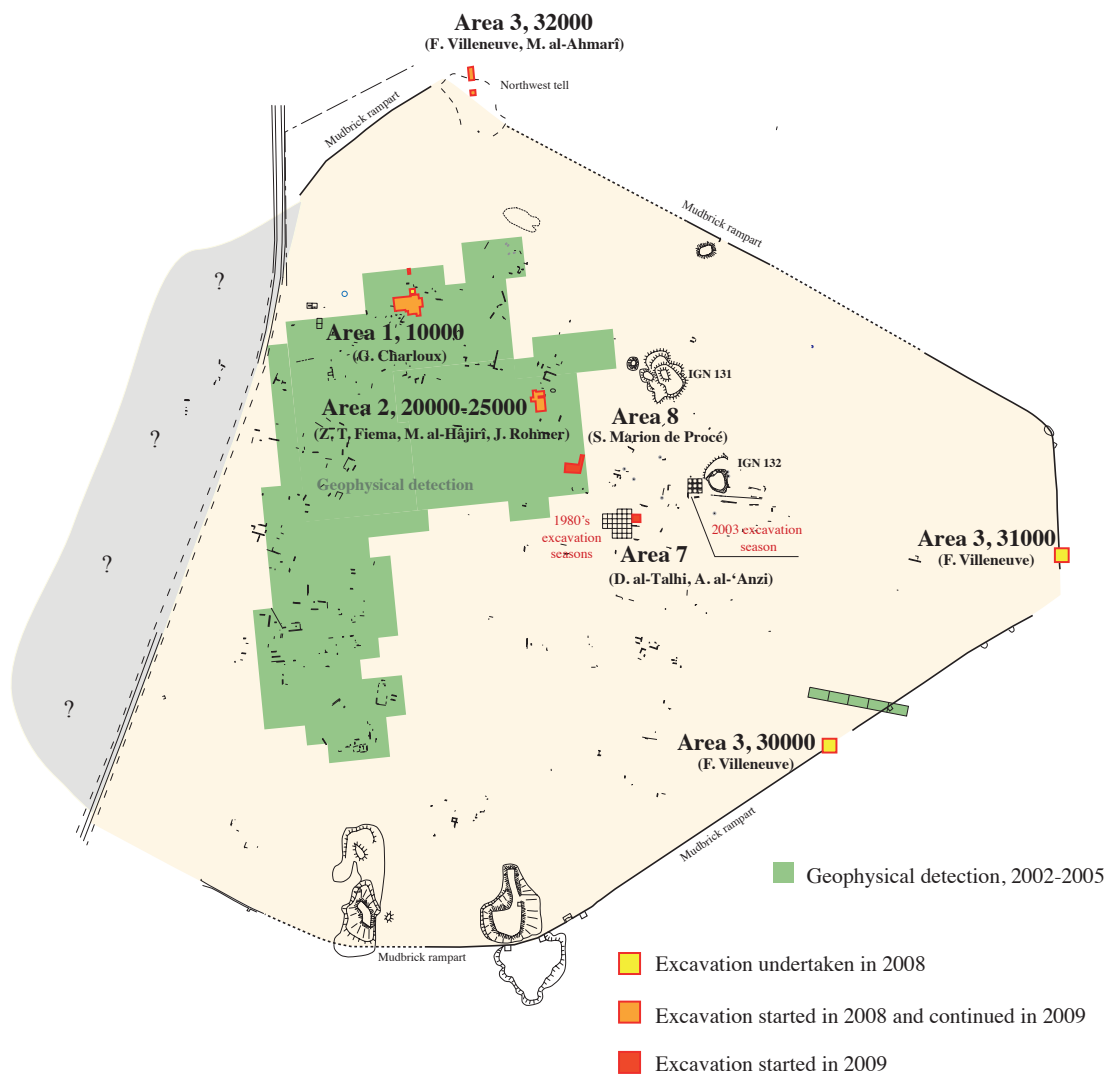
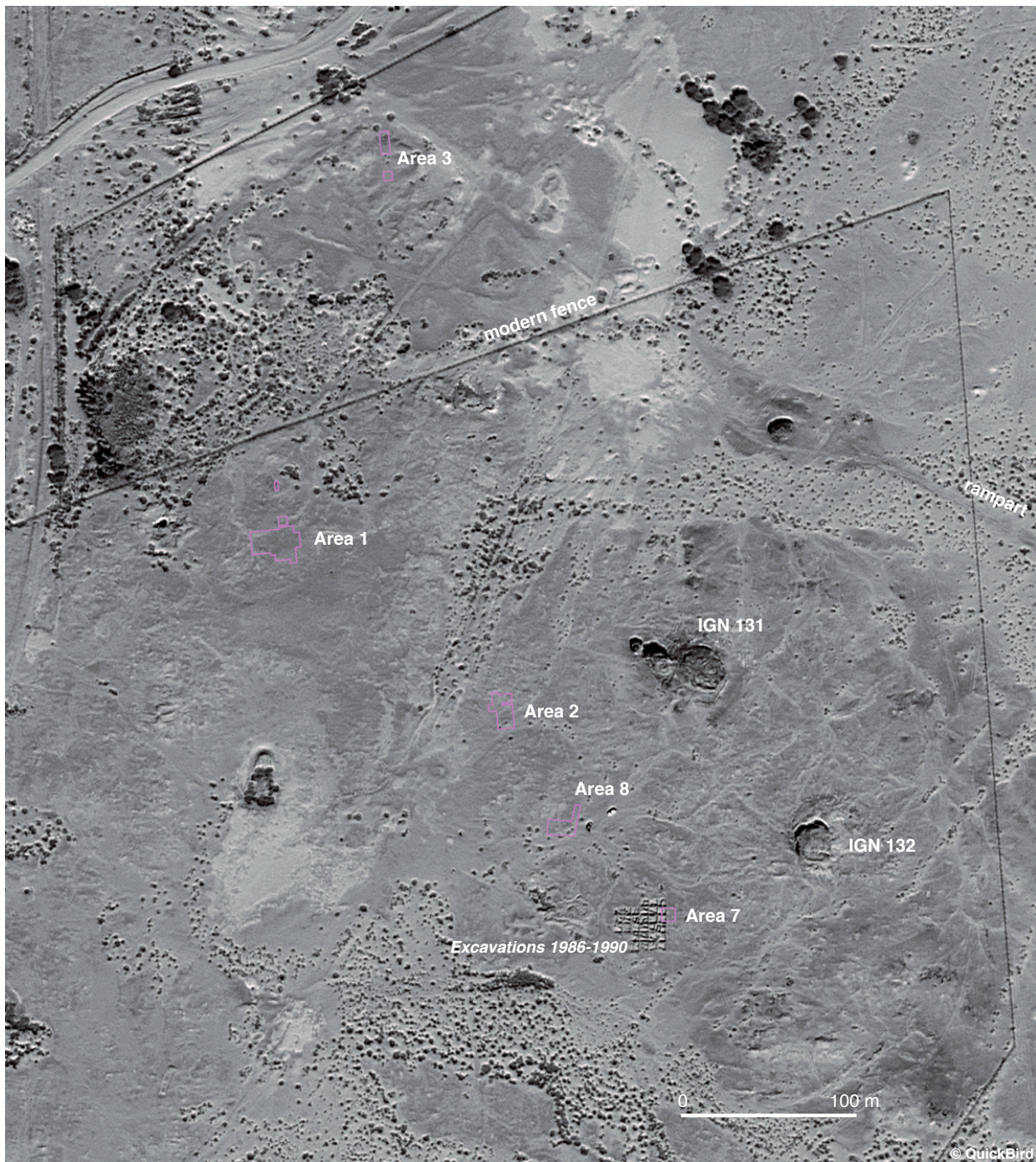


Fig. 3. Plan showing the excavated areas within the residential area



Area 1: see the report by G. Charloux
 Area 2: see the reports by Z. T. Fiema, J. Rohmer and M. al-Hâjirî
 Area 3: see the report by F. Villeneuve
 Area 7: see the report by D. al-Talhi and A. al-'Anzi
 Area 8: see the report by S. Marion de Procé

Fig. 4. Satellite image showing the excavated areas within the residential area

Area 1, Residential Area

Residential Area, Area 1

Guillaume Charloux

Taking into account the results from the 2008 archaeological season¹, we continued our investigation in Area 1 following two main objectives: 1/ widen the upper domestic construction phase in order to get a more comprehensive view of the latest occupation at Hegra (Late Byzantine – Early Islamic, 6th - 7th centuries AD); 2/ undertake a new small sounding about 20 m north of the area (trench H). The latter was opened in an area with a high geophysical resistance covered with a large amount of heavily fired and deformed ceramics fragments. Our hypothesis was that these fragments came from an oven which would still be *in situ*.

The second season of excavations was conducted by Guillaume Charloux, assisted by six workmen. Jean Humbert (IFPO, Damascus) drew the final plan of the area. Topography was completed by G. Charloux and J. Humbert.

In its largest extension, Area 1 measures 27 m (north-south) by 28 m (east-west), i.e. it covers more than 400 m² (without taking trench H into account) (fig. 1). Eight trenches (A-H) have been opened (fig. 2). All layers, structures and features were numbered continuously starting from 10118. At the end of the season, 74 *loci* (up to 10192) had been added to the database (see *locus* list).² Most of the layers were carefully sieved and this was particularly the case for all the floors and for the layers from the deep sounding in trench A. Surface and destruction levels were not sieved.

For information, the bench mark used for Area 1 is located north of trench A, at a height of 778.90 m above sea level. For simplicity, we used the height 78.90 m (removing the hundreds) in the database and in the field notebooks.

¹ Charloux, al-Mûsa, Marion de Procé 2009, p. 47-82.

² Objects were numbered according to the layer in which they were found, the type of material and a sequential number per material type.

Results

The results of this season concern mostly the Late Byzantine – Early Islamic, 6th - 7th centuries AD (phase 1a³) but we also found layers belonging to the Nabatean period in trench H (probably corresponding to phase 1d).

Phase 1a

The widening of the area (fig. 3) was done by: 1/ removing the baulks; 2/ clearing the floors left unexcavated in 2008; 3/ extending the trenches and discovering new rooms, mainly towards the east (trench A), the south (trenches C and F), and the street to the north (trenches B-D).

In the following pages, we shall first describe the new walls and second the spaces they delimitate.

Description of the walls

Northern limit

Contrary to what we thought in 2008, walls 10005 and 10007 do not belong to the same structure, even if they are still part of the northern limit of the domestic architectural unit. The removal of the north-south baulk separating trench A from trench B showed that wall 10005 abuts the eastern face of wall 10006 (from phase 1a-c) which is itself abutted by 10007 to the west. It also explains why 10007 is not in the exact alignment of 10005.

To the east, wall 10005 abuts a nicely cut red sandstone block located at the extremity of 10064. The northern limit of the unit (fig. 4) continues with a new wall, 10126 (4.30 x 0.80 m) which runs in the same direction in the same line as 10005. It is made of mudbricks (one row of headers against one row of stretchers). No sandstone foundation has yet been found. A small sounding was opened in front of it but it did not allow to exhibit its base.

Inner walls

Wall 10064 was more widely cleared than last year, since trench A was extended 6 meters to the east. Its faces appeared on both sides, mainly by the cleaning of the adjacent floors. It seems that this long wall creates a border between the eastern (10136, 10184, 10185) and western rooms (10110, 10111) of the area. No door was found yet, which seems to confirm the difference of altitude for the floors on either side. The base of 10064 appeared, one more time, under the floor of room 10185, at level 778.48 m. Wall 10064 extends to the south and stops before room 10187 where it probably abuts a new east-west wall which is not yet excavated (fig. 5).

Wall 10132 (2.90 x 0.64-0.70 x 0.30 m) is perpendicular to 10064, parallel to 10126 and linked to 10144 (2.73 x 0.71 m) with which it creates a right angle. The bases of 10132 and 10144 are approximately at 778.69 m above sea level. They have a mudbrick elevation (rows of headers and stretchers), with a sandstone foundation (irregular in the case of 10144). A nice red sandstone block inserted inside wall 10144 seems to support lines of an unclear (and

³ Charloux, al-Mûsa, Marion de Procé 2009.

undeciphered) inscription which was covered by chalky plaster. It is undoubtedly a reused block similar to the one at the northern extremity of 10064.

What we initially identified as a single east-west wall 10143 (2.13 x 0.62 m), perpendicular to 10144, is probably composed of three parts (fig. 6). The western part, which abuts the eastern doorjamb of door 10178, the middle part, which is probably the extension of 10144, and the eastern part, namely wall 10139 (0.72 x 0.65 m; base at 778.61 m).⁴ All these walls were certainly built together, with the same technique (mudbrick on top of a single sandstone foundation). It is worth mentioning that the bases of 10143 and of threshold 10178 are linked, but with a strong inclination from east to west. Perpendicular wall 10073 (1.47 x 0.43 m minimum) abuts 10139. One to two courses of sandstone block(s) was/were used in its foundation (base at 778.62 m). Only the northern part of its western face was cleared and it will deserve more attention next year.

South of trench C was also studied during this season. We re-examined room 10111 and tried to identify its southern border. We entered there a highly compacted area of “*magloub*” made of the destruction of the mudbrick elevation, on top of the floor. It was very difficult to detect the masonry of the walls, particularly when they did not have any sandstone foundations. This is the case of walls 10135 (2.74 x 0.65 m) and 10161 (2.09 x 0.65 m), which are not exactly aligned but create a curve even more difficult to recognize in the field (fig. 2). Wall 10135 is clearly oblique (southwest to northeast) to 10064, although 10161 is perpendicular to 10001 and to 10162 that it abuts.⁵ Walls 10135 and 10161 suffered much from the excavation despite the fact that the existence of this mudbrick wall was supposed shortly after the opening of this sounding. It was possible to identify its real structure only at the end of the work, and after some destructions and the clearance of the adjacent floors.

North-south walls 10142 (3.99 x 0.62 m) and 10160 (3.70 x 0.64 m) are parallel and built with two courses of small sandstones and the usual mudbrick superstructure made of two rows of headers and stretchers. They are also at exactly the same altitude (778.96 m) (figs 7-8).

Wall 10162 (1.80 x 0.62 m) was difficult to identify (fig. 9) despite the fact that some mudbricks were clearly organized and that floors on either side of it seemed to stop against its faces. It is placed to the south in the exact line of 10001 the sandstone foundation of which was clearly seen. It is probable that 10062 is abutted by 10001 and had no sandstone foundation, but its base was not surely reached. This wall still needs to be more excavated for a full understanding.

Further to the east, we widened trench F to the south, where we discovered three new constructed

4 We observed what seems to be three segments of a single wall. The first one to the east 10143 is undoubtedly linked to the threshold 10178, although its base has a strong inclination from west to east. The two other segments are more problematic. Nothing clearly shows that there are three segments rather than two or one but this is assumed because of the presence of a clear vertical fissure in the structure (seen in the south section) in the line of the western face of 10144 corresponding to the great difference between altitude in the bases of 10143 and the southern extremity of 10144 (see section). Secondly, we distinguished wall 10139 to the east, because the extremity of wall 10144 made us suppose that there is another perpendicular structure to the east, different from 10143.

5 It abuts in fact two reused grindstones, intentionally positioned vertically against the eastern faces of 10001.

structures and continued the clearance of mudbrick wall 10090 (4.47 x 0.70 m). This wall, without stone foundation, starts against 10043 (the relationship was not seen last year) and seems to continue to the south until it abuts perpendicular wall 10168 (3.85 x ? m ; base at 779.06 m). The sandstone foundation of 10168 clearly goes further wall 10090. The southern face of 10168 was not cleared this year.

Further west, north-south wall 10141 (5.02 x 0.62 m) stands north of 10168 (fig. 2). Its southern extremity may have been cut by the foundation trench of 10168, but it is not absolutely certain.

Doors

Three new doors, 10171, 10178 and 10179 were discovered this year, although all of them were not studied in detail.

In room 10190, threshold 10171 (1.27 x 0.18 m) abuts wall 10100 and marks the beginning of a wall going south more or less parallel to 10141. Threshold 10171 (fig. 10) looks more like a double step (with four blocks in its lowest part) between two rooms. Doorjambs were not preserved, neither for 10178.

Threshold 10179 (1.15 x 0.20 m) is made of two white sandstone blocks inserted inside wall 10142 (fig. 2). It permitted to go from room 10187 to room 10188.

Foundation of 10178 (1.15 x 0.20 m; base at 778.42 m) was more fully excavated (figs 6 and 11). A sounding was opened in front of it to study its masonry. From two to four irregular courses of sandstones blocks support the two nice white sandstones blocks of the threshold of door 10178. The whole structure measures 0.40 m high. Two nice white sandstones doorjambs (c. 0.55 m high) still stand on both sides of the doorway. Their upper part is destroyed.

Locus 10180 (figs 12-13) constitutes an originality in this presentation since it seems to be altogether a wall, a platform or a threshold (base at 778.70 m). It is made of two courses between 10126 and 10132, but on one row (1.20 x 0.21 m). The upper course is made of two used and aligned blocks looking like a threshold. Floor 10133-10184, west of 10180, is about 0.10 m on top of the floor to the east, creating like a small platform, since no opening was discovered in the adjacent walls.

Description of the spaces

Trench A

The excavation of the northeastern part of room 10110 was not completed last year and we started by taking off the eastern part of the baulk of square A which remained on top of it. As expected, almost complete pottery vessels (*locus* 10016) were found *in situ* on the floor, under the mudbrick destruction layer. The western face of 10064 and its corner with 10005 were also found. The excavation of room 10110 (c. 7.50 x 4.20 m) has been completed this year (fig. 14), and we can now start the study of the pottery as well as of the metallic and lithic objects found in this room (fig. 15).

To the east are located three rooms separated from the western ones by the long wall 10064 (fig. 2). No pathway was uncovered in between.

First room is 10184 (see figs 14 and 16) to the north (4.07 x 1.33 m) and the east (4.62 x 1.03 m). Its L shape may indicate that we are in fact dealing with two different spaces, one to the north and one to the southeast, but we found no door in-between. The floors yielded a great amount of material, among which several big bones which probably belong to dromedaries. Under a thick (to the south) and very compacted destruction layer (10125/10145) were identified floor layers 10151, 10137+10172 and 10133 for the platform 10180. Small ashy areas were also observed, against the northern face of 10132: to the northeast under the bulk; against the face of 10144 (*locus* 10155 to the north) and to the south, where a large, but not well delimited, fireplace (?) 10159 was discovered. In the latter area, there was an accumulation of a large amount of bones, sherds, stones, in a dark ashy sandy-silty layer, looking like the depository of a fireplace for cooking.

Room 10185 (3.14 x 1.54 minimum m) is surrounded by walls 10064 to the west, 10173 to the east and by walls 10143/10144/10139 to the north (fig. 2), with an opening in its northwestern corner giving access to room 10136. As is the case for rooms 10136 and 10145, the floor of 10185 was covered by a soft floor layer 10174 (and the under part of 10148), under a very thick and hard compacted destruction from adjacent walls, layer 10131 (which made difficult the discovery of the mudbrick upper structure of wall 10173). Some material was found on the floor layer (10174/10148), especially big bones probably from dromedary. Note especially an interesting trapezoidal stone with three decorated sides, 10148_S01 (fig. 17). The decoration consists of vertical and horizontal lines made of small points. The function of this stone is unknown but it is possible that it was reused from an earlier building.

The southern part of room 10185 still remains to be studied.

One enters room 10136 from 10185 to the south. This small room (c. 4.00 x 2.00 m) is delimited by walls 10064, 10132, 10144, 10143 and door 10178. Its clearing revealed a nice sandstone “basin”⁶ with its lid in place upon the floor layer, as well as some objects and fauna similar to that found in adjacent rooms. Under surface layer 10129, destruction layer 10131 (with many architectural rectangular stones) covered soft floor layer 10138 on top of a hard compacted floor 10181 (fig. 18).

Trench B (fig. 19)

Room 10113 (6.59 x 3.13 m) was more fully excavated during this season, since we took off the baulk which was hiding its western part and the connexion of the floors with wall 10008. At first, we kept clearing the southern part of layers 10017 and 10063, and found some new sandstone blocks fallen on top of ceramics (seemingly from the door going on top of threshold 10092).

⁶ The interpretation of these “basins” is difficult because most of them seem to have been reused. Their circular bases were cut and they had therefore to be put, but not systematically, on top of flat stones. White plaster was apparently added to waterproof them but it is not certain that they were filled with liquids.

Feature 10192, found under the baulk in room 10113, deserves some attention. It is composed of three large white sandstones blocks: two in connection and parallel to the wall 10008, one perpendicular to the south (perhaps fallen) and of many small stones to the west. It is not yet an understandable structure but it seems to have been intentionally positioned here. Is it a stairway leading to the next room 10114? Or a platform for the preparation of food?

Trench C (fig. 20)

The northern limits of room 10111 were discovered last season but it was surprising that no floor associated with it was observed. In 2009, we finally found a floor layer 10177 under a thick destruction layer 10048, at a rather low altitude in comparison with next floor 10016 (as we could have guessed from the sections drawn in the small sounding opened in its northeast corner at the end of the 2008 season⁷). Some 0.20 m of earth was thrown away before we reached the floor. In this destruction layer, we found many objects (particularly grinding stones) supposedly fallen from the roof. In floor layer 10177, many objects (metal, stone, glass, ceramics, etc.) were also found. A large round sandstone structure was laying horizontally on the floor, looking like the base of a basin with cut sides, and with a small hole (c. 3 cm in diameter, not placed in the middle).

The southern limit (walls 10135, 10160, 10161) of the room 10111 was also shed to light this year.

A narrow window was opened in room 10187 (3.72 x 0.60 m). Some grinding objects were found in floor layer 10147. A white sandstone threshold, without doorjamb preserved, gives access to the next room 10188, where floor 10146 is at the same altitude as in next room 10187 (79.10 -79.15 m).

Room 10188 measures 3.76 x 1.94 m. Its southern limit was not observed yet. A small jug was found in the northwest corner. In the centre north of the room a small 7-8 cm hole appeared in the floor. As the hole was rather deep, a small east-west sounding was done front of it, which showed that a jar was unearthed in it (fig. 7).

Next room 10189 (fig. 21), on the other side of 10060, is very small (1.38 x 1.34 m) and shows no entrance for the moment (it is probably located further south). A succession of layers was observed, from 10163 to 10167, with two thin floors 10164 and 10166.

Extension of room 10112 (6.01 x 2.38 m north to 0.65 m south) was undertaken this year. It revealed the continuation of walls 10090 and 10001/10162 to the south, creating some sort of narrow corridor at its southern extremity (fig. 2). No mud-brick wall was found in between, although the important amount of sandstone blocks stops surprisingly in the centre of the space. Floor 10094/10175 seems to extend all over the place, even if it is less clear in the centre-south of the room.

⁷ Charloux, al-Mûsa, Marion de Procé 2009, p. 68, fig. 10.

Trench F (fig. 22)

Room 10114 (4.88 x 2.32 m) is now quite different from what it appeared to be last year since a dividing wall was found in the middle. Indeed, a large stone, previously cleared, is in fact the extremity of the sandstone foundation of a north-south wall 10141 (5.02 x 0.67 m). This wall separates room 10114 to the east from room 10190 to the west.

No door entering 10114 has yet surely been identified for the moment, although it could well have been situated in wall 10100. A thick destruction layer (10039/10049), in which were found a large millstone and the base of an upside down jar, along with other objects, was covering floor 10096. There is little doubt that this material fell down from an upper stair or a roof. Few artefacts were found in this space.

The adjacent room 10190 (5.43 x 2.25 m) was not fully cleared during this season. Another wall in the line of threshold 10171 probably extends to the south, more or less parallel to 10141. Once again, a floor, 10170/10154, and a fireplace, 10156, were excavated under the thick “bricky” layer 10140. The most interesting fact comes from the discovery of a sandstone cylinder positioned horizontally on the floor layer, in which parts of a wide pottery basin fallen under a sandstone block were found.

Street 10183 (and room 10191), trenches A, B and D

To the north of this domestic quarter, runs street 10183 (c. 25.00 x 3.00 to 3.50 m) (fig. 23) the existence of which was already supposed in 2008⁸. Its long southern limit (10005, 10007, 10022) was previously known. We extended it to the east by excavating wall 10126 and adjacent layers. To the north (fig. 2), a surprising but almost obvious conclusion was reached through considering feature 10053 as two thresholds *in situ* in the line of the northern limit of the street rather than as two fallen doorjambs. It appeared logical to excavate the limit of the street first on the east, where an alignment of some badly eroded sandstone blocks was visible (wall 10149). East of trench D, the wall foundation was destroyed by erosion. After clearing the western part of wall 10149, we concentrated on its centre and eastern parts. We decided to keep most of the mudbrick elevation, even though the mudbrick masonry was not observed everywhere. The discovery of floor 10152 (room 10191)⁹ to the north with fireplaces (mainly 10153) confirmed that mudbrick superstructure was still in place and must not be displaced or more scratched. Wall 10149 was reached till thresholds 10053. A narrow sounding was opened against it to check the presence of the sandstone foundation of 10149, which was indeed located at the expected place. Further east, another shallow sounding showed that a mudbrick wall 10176 was there again in the same line, as usually made of courses of one row of stretchers against one row of headers, although no sandstone foundation was discovered. It seems obvious that this wall extended further east where lines of sandstones appear. Then it probably makes a turn before

⁸ *Ibidem*, p. 56.

⁹ Room 10191 should deserve more attention in the future because very little is known from the quarter north of 10149.

being linked with another line of stones constituting the northern border of a street towards the east.

Note that, for the moment, only one very large perpendicular wall (10150) was identified to the north of 10149, and we suppose that one also stands between thresholds 10053.

The floor of street 10183 was mainly destroyed by erosion, particularly to the west and the south. Some relics are probably still in place but we preferred to concentrate on well preserved floors in the domestic quarter rather than spend a lot of time for a long lasting work with uncertain results.

Discussion

This season offered many new information to better understand the settlement in this part of the site, but the work done also raises numerous questions which deserve a short examination:

1. Did the rooms have a roof, a stair or were they more unroofed?

Does the material collected from the floor layers (upon the floor itself) come from the occupation of the first floor or from the roof or upper stairs? And if it is the case, how can we differentiate artefacts which come from the lowest occupation from those which come from the top? Both would indeed be found under or in the lowest part of the huge mudbrick destruction layer, but also in the thin and most of the time very soft floor layer between the destruction and the floor itself? Is the localization of the objects, as drawn in the field, useful in terms of functional interpretation? Is it relevant for archaeological sequence? Can it create problems for the identification of the function of the rooms, for instance?

The question of the “roof” is usually problematic in archaeology. Our hypotheses are based on some more or less well defined criteria and not according to experimental archaeological studies. The criteria, which are not satisfactory, are the following: dimensions and shape of the room; presence of structures for climbing or retaining the terrace or indicating the use of open spaces; quality of the walls and possible remains of the roof (wood beams, vegetal traces, stone or brick vaults, etc.); fallen material and layers of destruction of features.

Rooms 10110, 10115 and 10116 are all located south of the street and are wide spaces. A lot of material was found in 10110 but such was not the case for the other two, possibly because of the erosion. No column element nor any specific structure was found. We also noticed some fireplaces. Taking all this into account, particularly the size and the difficulty to get long wooden beams for the roof (although palm trees may have long trunks), we suppose that these rooms were open spaces.

The size and shapes of the other rooms allow for the existence of a roof or terrace. The main argument for the existence of an upper space is the discovery of upside down ceramics (fig. 24) and stone objects in destruction layers (fig. 25), notably in rooms 10111, 10190 and 10191 where we found a great amount of grinding objects which were probably originally used on a roof. For the other rooms, we have no clear evidence of an upper stair although a roof is probable.

2. Why some walls are entirely in mudbricks while most of the walls have sandstone foundation? Is there any architectonic, chronological or functional reason which would explain this difference? What kind of architectural method was used in building these domestic quarters, if there was one? Can we identify a logic in the architecture?

No architectonic, chronological or functional reasons have been found yet to explain the different techniques for founding the walls. Certainly, walls with mudbrick foundations are occasional while walls with stone foundations constitute the standard.

Looking at the plan of the excavated area provides clear assessment of the internal organization and building preparation. Some characteristics, such as the technique which consists in building a long north-south wall before adding adjacent perpendicular walls at its extremities, are striking. The internal organization of the architectural unit seems to be more empirical: rooms have irregular shapes and have been subject to continuous rearrangements.

In conclusion, the 2009 season clearly shows that Area 1 is part of a domestic quarter of agglomerate living spaces dated to between the Late Byzantine – Early Islamic, 6th - 7th centuries AD, although this date remains uncertain. The quarter is divided by a 3.5 m wide street running east-west. Living areas were divided between open and roofed spaces, with domestic activities (grinding notably) taking place on top of the terrace or upper stairs. The circulation is still to be understood (for a proposal, see fig. 26).

A restitution of Area 1 would probably look very much like the abandoned village of al-‘Ulâ, presently under restoration, with its narrow streets, its urban organization and its surrounding mudbrick wall (fig. 27).

Phase 1d – Trench H

Trench H (2 x 5 m) is located 15 m north of Area 1 (trench G) in the line of our general north-south section (figs 2, 28 and fig. 29). Top altitude of the sounding (southwest) is 778.99 m and its bottom is 777.95 m (northeast), and this would approximately correspond to phases 1b-d in trench A, although the slope is strong and phases 1c-1d would be better expected.

It was decided to excavate in this area because of the high magnetic resistance revealed by the geophysical survey and the presence of a lot of slag on the surface. The excavations did not reveal any oven.

The only archaeological level encountered in the trench was reached after the removal of a thick mudbrick destruction layer 10120 (and two upper surface layers 10118, 10119). Successive occupation layers appeared to the southeast against a north-south mudbrick wall 10127 with nicely cut stone foundations: 10121 is a thin layer of eolian sand under the destruction and 10122 is a succession of two thin floors. The latter is associated with a sandstone pavement and is separated from layer 10124 by layer 10123. On floor 10122 were found typical Nabatean sherds *in situ*, apparently unmixed.

The excavation stopped after the discovery of the inhumation of an animal (complete skeleton

placed circularly, under the floor) in 10124+10130. This inhumation was left in place for zooarchaeological examination (fig. 30). The area east and north of wall 10127 was not excavated in 2009. It should be noted that the layers in this sounding are difficult to excavate, particularly because the mudbricks are very hard and compacted and because the slope is strong to the west and to the north due to erosion.

Few considerations about erosion and topography in area 1

Erosion had a strong effect on the evolution of Area 1 at Hegra, its topography and preservation, and consequently on our understanding of the archaeological work (fig. 31).

Erosion in the residential area of Hegra is of three different kinds: water flows from sudden winter storms, sun and south-north/north-south winds mainly¹⁰. Erosion has created a topography of low-lying hills, with shallow depressions in between, sloping globally from east to west in the central area. To the north, a wide flat area, with the “Tell” in its centre, shows that events of strong erosion took place there, since the virgin soil level is already apparent. The recent soundings on the “Tell” show that the rempart was extending far north and that domestic neighbourhood was much destroyed in this direction.

Elsewhere in the city, depressions between the “hills” are not randomly located. When caused by water flows, they run in previous small depressions or in empty spaces such as streets, courtyards, disturbed places or places which were more lightly occupied than others. This was clearly observed in Area 1, where the water flows ran down the streets which played the role of channels, the water being canalized by the stone foundations of the walls and by the mudbrick destruction of their upper structure. When no other “choice” was available, water joined the main stream by cutting inside the houses, thus destroying the living spaces, as happened in the western part of Area 1.

The first sounding we undertook in Area 1 was intentionally located on top of a hill dominating the area to avoid this problem and to get the best possible view of archaeological strata. Looking at the aerial view of the site, we noticed furrows east and north of the area. These correspond precisely to the streets recently cleared (fig. 32). To the west, however, the furrows run north through the houses, destroying the walls and the floors. In the centre, water encounters the strong resistance of the mud-brick destruction layers which are hard to concrete compacted, 0.80 m deep, and which have fortunately protected the floors and the archaeological artefacts of the upper level 1a.

Another aspect may be relevant for the description of the ancient topography of the site: the comparison of the altitudes of the floors and the bases of the walls which belong to the last occupation. First, we find stone foundations to the north of Area 1 which are clearly higher than the stone foundations of walls in Area 1. Second, the excavations have shown high variation of altitudes between contemporaneous floors, for instance between floors in rooms 10136, 10110

¹⁰ See on this subject the report of J.-B. Rigot in Rigot 2006.

and 10116 (from east to west, see fig. 33). The diagram clearly shows an east-west ascending slope, corresponding seemingly to the gradual elevation of the wall foundations. This slope corresponds very much to the present shape of the hill, of the areas of erosion and of the streets.

At last, an additional clue may illustrate the evolution of the topography at the site, and the global shape of the site in each period: the comparison of the altitudes of contemporaneous archaeological levels in the excavated areas. Looking at the altitudes of each occupation period (even if divided into such imprecise periods as Nabatean, post-Nabatean later periods in the residential area observed during archaeological excavations (fig. 34), we notice that a general relationship may be seen with the present topography at the site.

The understanding of the topography and of the erosion may have strong implications on the interpretation of our work and on the choice of future soundings which may not be only decided according to the presence of stone bases or lintel. For instance, if we consider that the excavation of trench H north of Area 1 was motivated by the results of the geophysical survey and the possible existence of an oven, we may be surprised by the results. Indeed, the sounding in the middle of the area with strong magnetic resistivity showed that no oven existed under the surface. The large amount of slag (unshaped dark green vitrified ceramic fragments) lying on the surface may only be the residue of a firing mudbrick structure which has been completely eroded (fig. 35). Only the heavy and more resistant slag survived and remained in place.

Bibliography

- J.-B. Rigot, “Le site de Madâ’in Sâlih dans une perspective géoarchéologique”, in L. Nehmé, Th. Arnoux, J.-Cl. Bessac, J.-P. Braun, J.-M. Dentzer, A. Kermorvant, I. Sachet, L. Tholbecq, “Recherches menées de 2001 à 2003 dans l’ancienne Hijrâ des Nabatéens”, *Arabian Archaeology and Epigraphy* 17, 2006, p. 41-124.
- G. Charloux, M. al-Mûsa, S. Marion de Procé, “Area 1. Residential Area”, in L. Nehmé, D. al-Talhi and F. Villeneuve (eds), *Hegra I. Report on the First Excavation Season at Madâ’in Sâlih, Saudia Arabia, 2008*. Riyadh, 2009.



Fig. 1. General view of area 1

Fig. 2. General plan of Area 1 (see A3 at the end of the report)



Fig. 3. General view of the eastern part of area 1 excavated this year



Fig. 4. Northern limit of the domestic quarter south of street 10183



Fig. 5. Wall 10064 creating an internal south-north partition

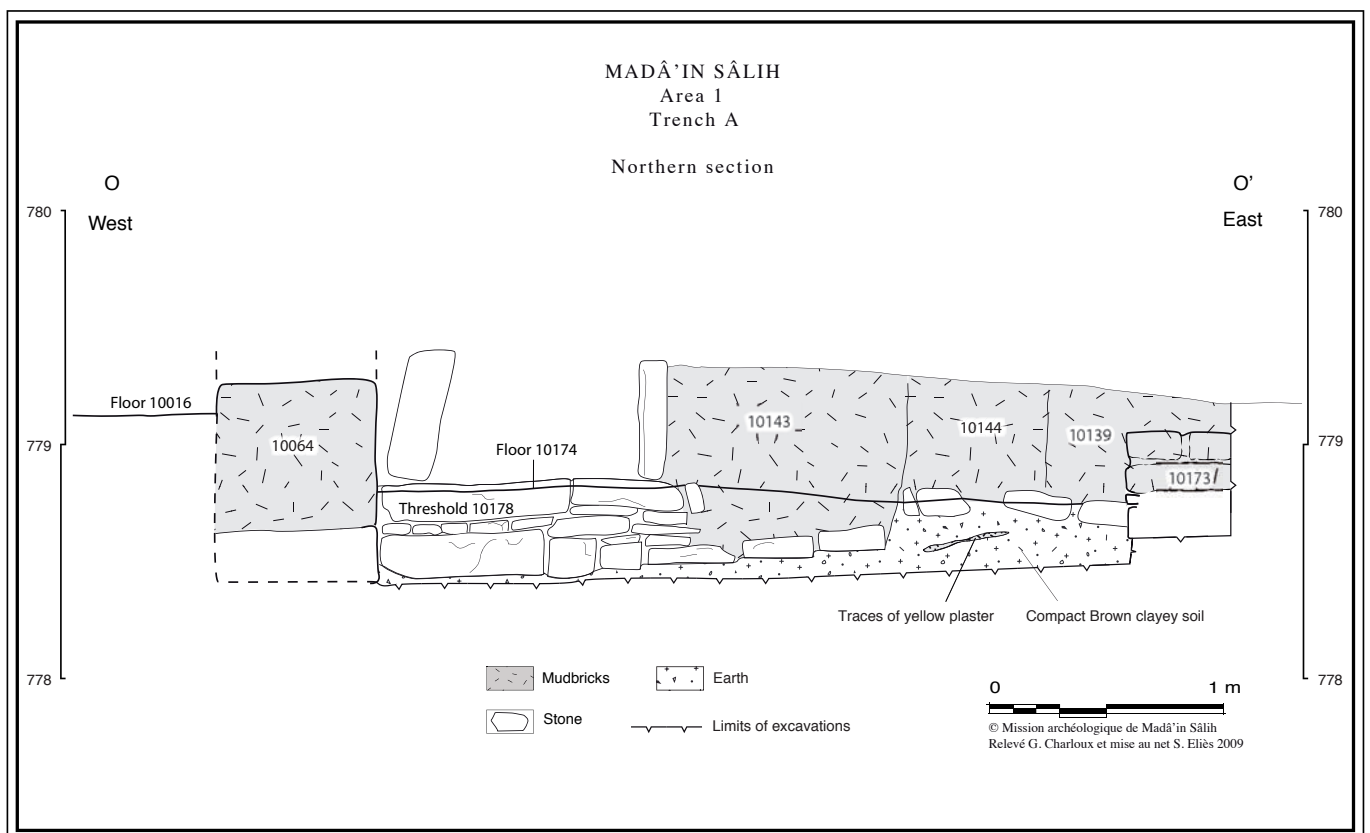


Fig. 6. Trench A, northern section

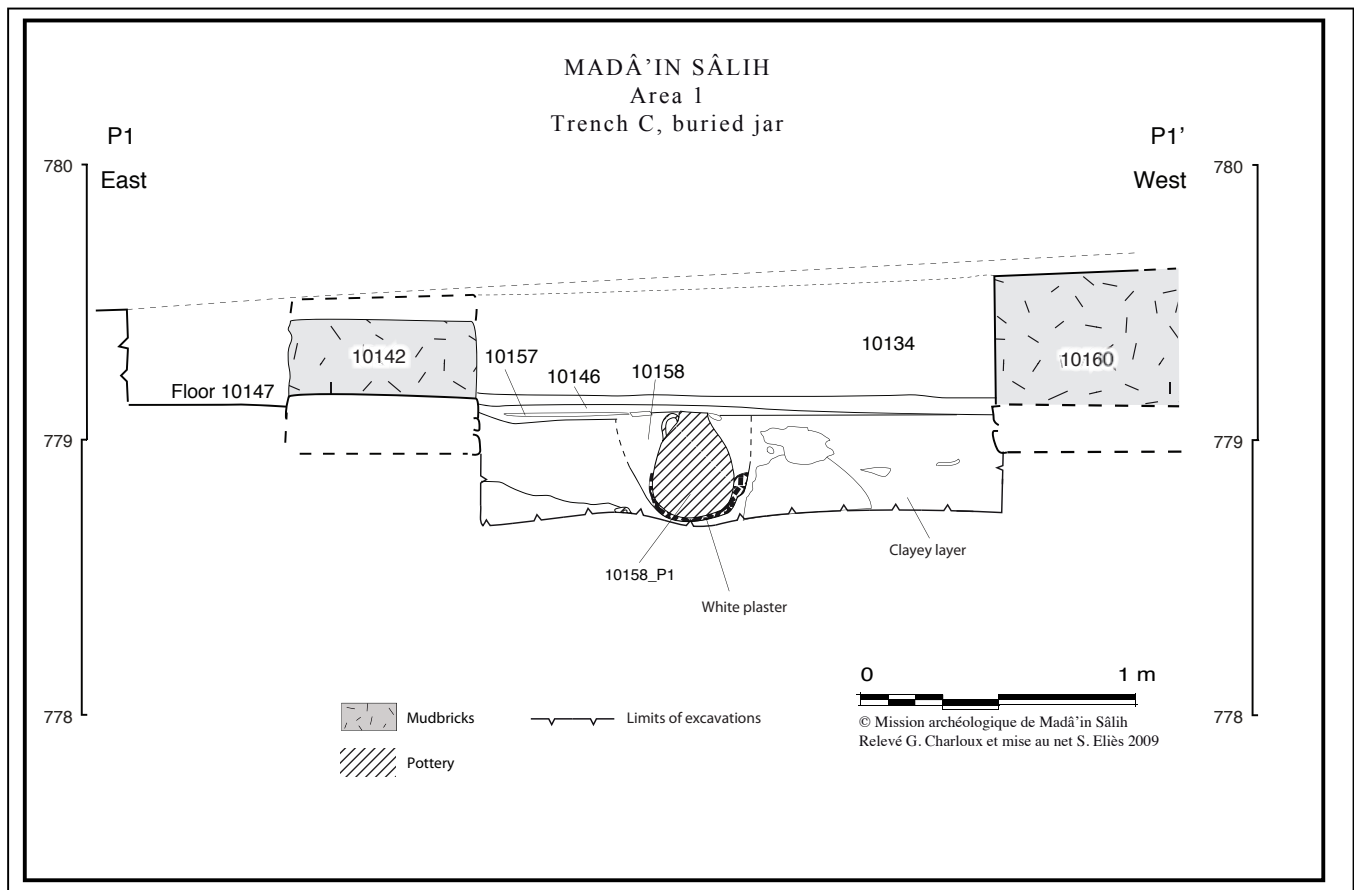


Fig. 7. Trench C, north section, jar buried in room room 10188



Fig. 8. Walls 10142 and 10160 delimitating room 10188

Fig. 9. Trenches C and F, southern section (see A3 at the end of the report)



Fig. 10. Doorjamb 10171 in room 10190, towards the west



Fig. 11. Foundation of door 10178



Fig. 12. Feature 10180

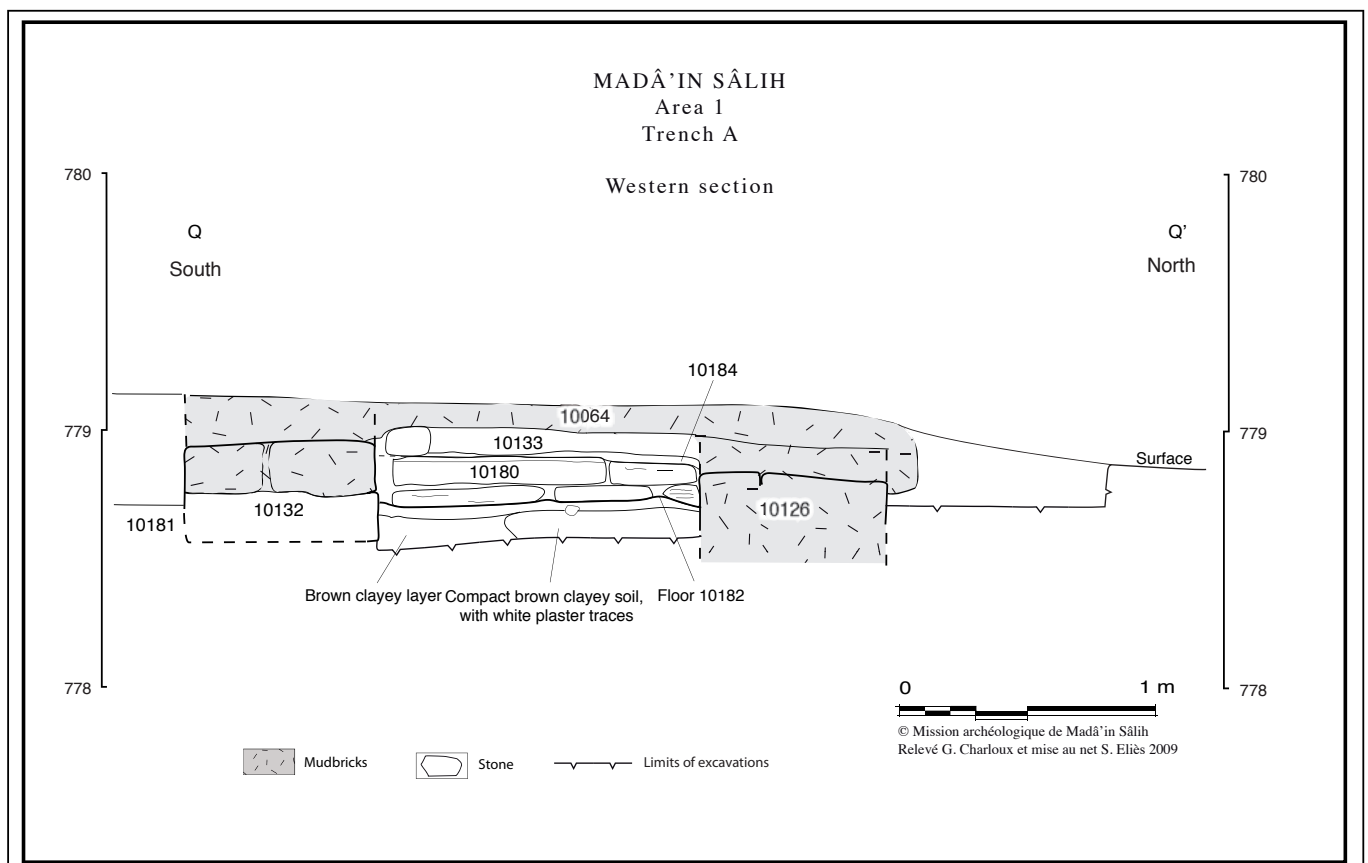


Fig. 13. Trench A, west section



Fig. 14. Rooms 10110, 10184, 10185 and 10136, after removal of material on the floor, towards the north



Fig. 15. Plan of room 10110 with material in place

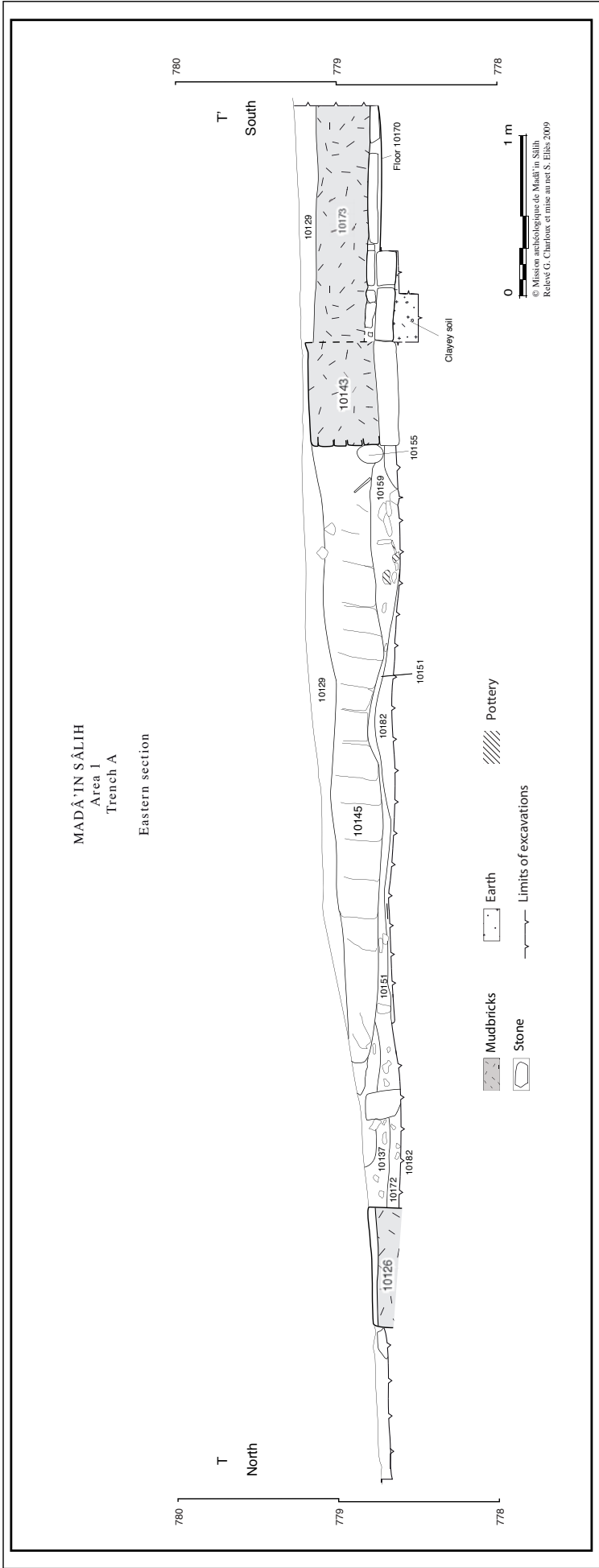


Fig. 16. Trench A, eastern section

Illustration to come

Fig. 17. Drawing of the trapezoidal stone (S. Eliès)

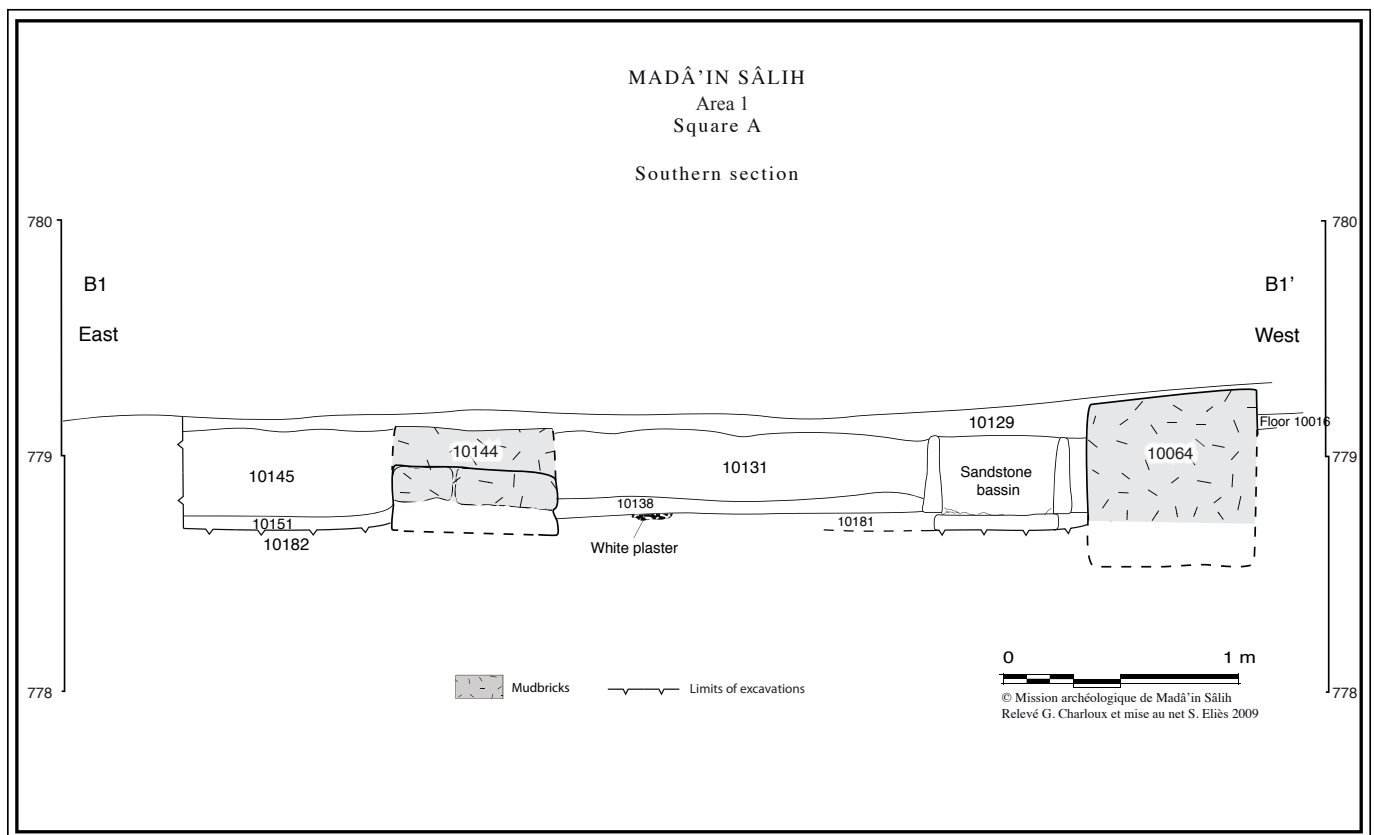


Fig. 18. Trench A, southern section



Fig. 19. Rooms 10113, 10115, towards the west



Fig. 20. Room 10111, towards the northeast



Fig. 21. Rooms 10111, 10187, 10188 and 10189, after removal of material from the floors towards the south-west



Fig. 22. Rooms 10112, 10114, 10190 from top



Fig. 24. Upside-down objects in room 10114

Fig. 23 Street 10183, towards the west



Fig. 25. Fallen grinding material in destruction layer 10048



Fig. 27. View of al-'Ulâ from top



Fig. 26. First hypothesis of circulation in Area 1 (walls of level 1a in beige, thresholds in blue, "basins" in green, fireplaces in grey and directions of circulation in red)

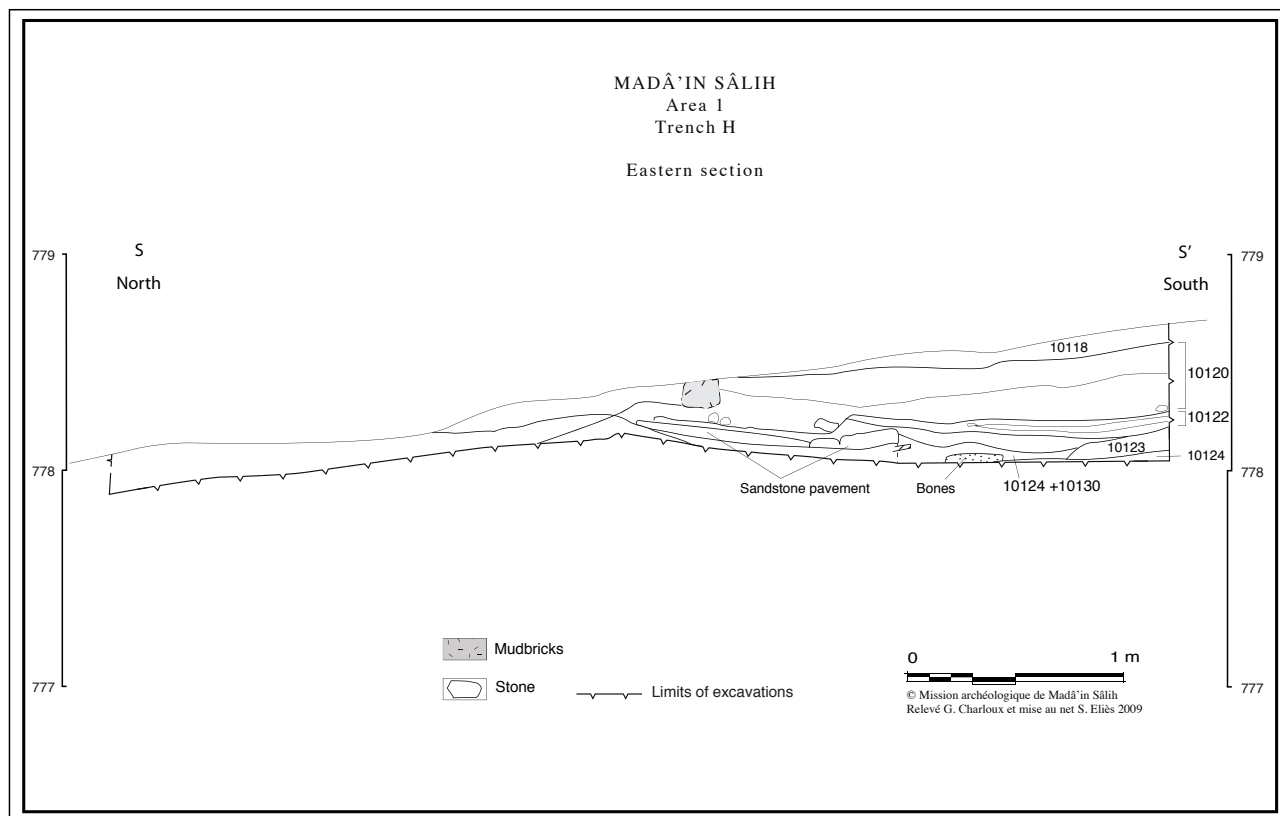


Fig. 28 Trench H, eastern section

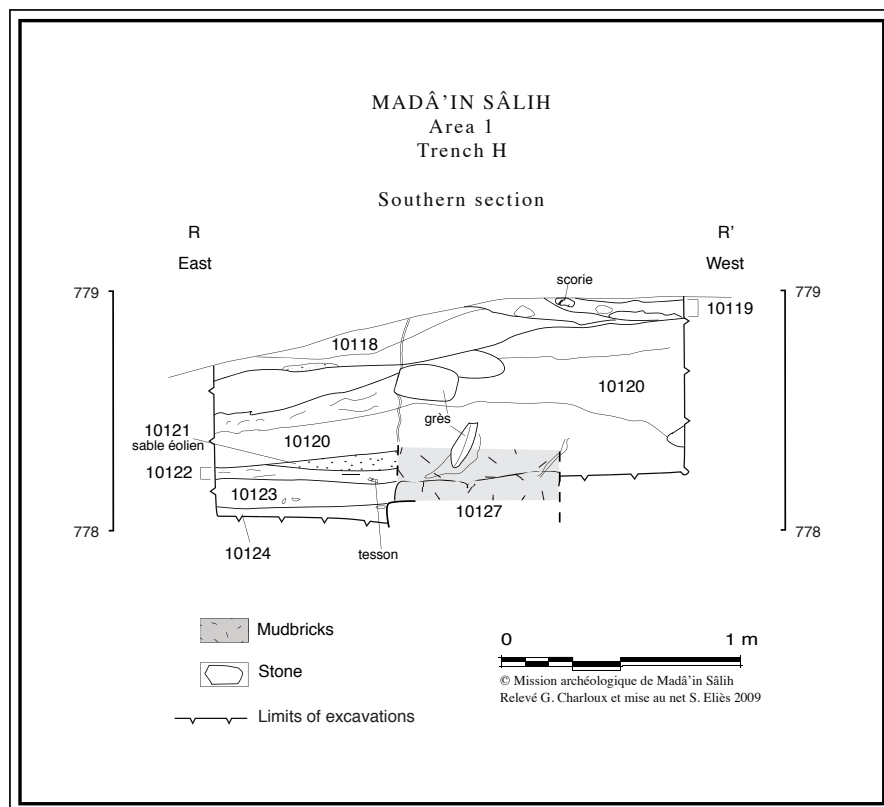


Fig. 29 Trench H, southern section



Fig. 30. Loci 10124-10130, with the animal's inhumation and wall 10127 to the west



Fig. 31. Area 1 at the beginning of 2009 season. Note the high degree of erosion which occurred since 2008



Fig. 32. Area 1 in the center of natural erosion furrows (walls of level 1a in beige, sandstone walls on surface in green, hypothesis of reconstruction of walls according to geophysical plan in blue, and natural erosion furrows in red)

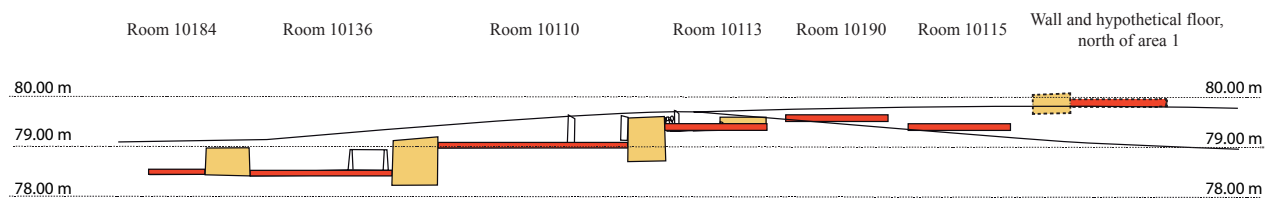


Fig. 33. Comparison of altitude of floors in Area 1 (floors in red, walls in beige). The upper line shows the surface

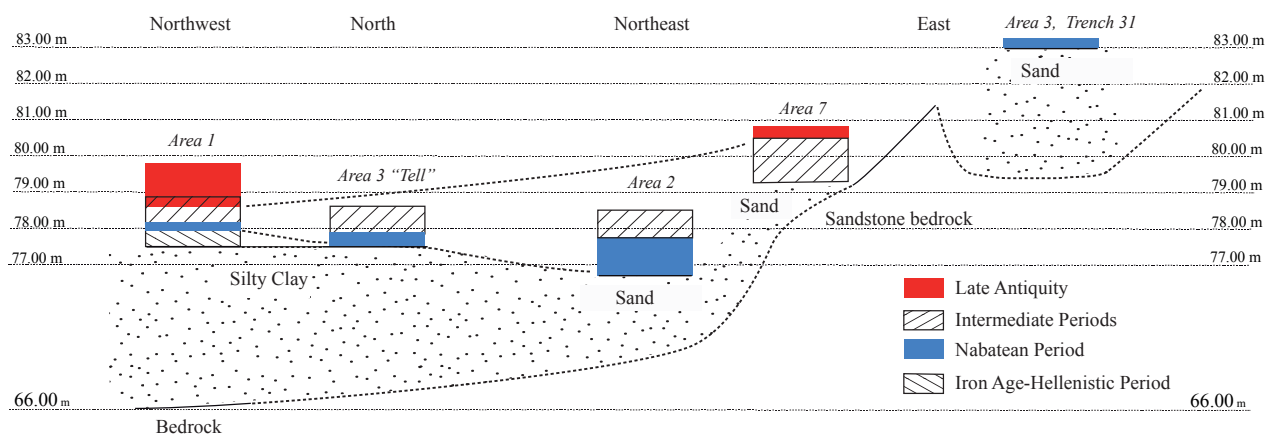


Fig. 34. Preliminary hypothesis sketch comparing archaeological levels in the residential area at Hegra



Fig. 35. Trench H before excavation.
Note the slag on the surface

Area 2 (20000 and 24000)

Residential Area, Area 2, Trenches A (20000) and E (24000)

Zbigniew T. Fiema

Activities and general observations

During the 2009 field season, the excavations in Area 2 continued in six trenches (A-F), three of which (D-F) were newly opened trenches (figs 1, 4-5). Further clearance and necessary stratigraphic clarification were also conducted in the 2008 trenches. Directly in charge of the author of this report were trenches A (old) and E (new). This report will summarize the 2009 work in these two trenches and will provide a new, vastly updated phasing for these trenches with references to the adjacent trenches, if possible.

Specifically, three interrelated and interdependent activities were conducted by the author of this report:

- excavations of the western extension of trench A (*loci* marked as 20000W, etc.);
- excavations of the eastern extension of trench A (*loci* marked as 20000E, etc.);
- excavations of trench E (*loci* starting from 24000).

Trench A, western extension

This extension formed a small quadrangle – 4 m north-south and 2.50 m east-west – located at the northwest corner of trench A. The reasons for opening this extension were two-fold:

- the clarification of the course and preservation of channel 20014;
- the ascertaining of the relationship between wall 20002, channel 20014 (trench A), wall 22006 (trench C)

The results obtained in this extension are of capital importance and these substantially alter the previous perception of wall 20002 and channel 20014. The channel indeed turns sharply to west – southwest but it had been completely removed in the area of the extension. Only a harder, beaten earth with small pebbles, i.e. the channel's bedding (*locus* 20014W) indicates its original course. Similarly, it is now considered doubtful if the channel originally went south. If it did, it would have encountered the mudbrick wall 20035 located under the later, stone wall 20013/20013W.

Already in 2008, thoughts were expressed as for the composite character of wall 20002. It is now apparent that this wall consists, in fact, of two walls: wall 20002W (west of the channel) and wall 20002 (east of the channel), the latter encasing channel 20014 in its structure. Wall 20002W bonds with wall 22006 (trench C) forming corner. However, only the foundations of 20002W are still *in situ*. These foundations are much deeper than those of 20002 and, in fact, due to the danger of collapse, the lowermost course was not reached. Wall 20002W should be earlier in date than 20002 but the difference in time is probably not considerable. It is also not impossible, although much less probable, that the marked difference in appearance resulted from the fact that these were constructed one after the other but still within one, large-scale construction phase.

The total uncovering of wall 20013/20013W and the discovery of wall 20035 prompted the re-examination of the connection between these walls and the massive mudbrick wall 20008. For this purpose, the connecting plaster feature 20034 was dismantled, revealing that there is a slight gap between these structures. Furthermore, it was already suggested that wall 20008 had originally continued northward and that, at some point of time, it was cut. This hypothesis is now fully confirmed: the wall had been cut to create a northwest-southeast passage and the cut is apparent (one-fourth of a brick preserved at the cut place).

Trench A, eastern extension

This extension was primarily intended to liquidate an awkward L-shaped part of the baulk, *c.* 2.80 m north-south and *c.* 1.80 m east-west. This remnant resulted from the specific placement of trenches A and B (and the baulk in-between) and the imposition of a new trench (D) in the area. As such, this operation was mainly the stratigraphic removal of the remnant between these trenches but it has brought an additional bonus in terms of clarifying the spatial relationship of structures in these trenches.

In particular, a very wide (*c.* 1.20 m) wall 20018 turned out to be two parallel, abutting each other walls – 20018 and 20037 – continuing in trench D as 23012 and 23003 respectively. These two walls must represent separate phases and thus indicate that the northwest-southeast passage probably has an earlier phase in which it was somewhat wider although then it was limited in the west by wall 20008 continuing northward.

Also, the installation 20005 was re-examined. It turned out that this installation has a stone substructure – *locus* 20036 – which could be as early as the period during which wall 20037 was constructed.

Trench E

This new trench – 3.50 m north-south and 9.45 m east-west – was set directly south of trench A, on the southern end of a low spur of land oriented northeast-southwest which gently slopes southwestward. It is flanked on its western and southern sides by a very wide but shallow wadi – an alluvial lowland – characterized by sandy soil and clusters of desert vegetation. The surface of trench E was largely featureless and sandy. The top surface (24000) ranged from

777.81 m in the northwest to 777.98 m in northeast, to 777.92 m in the southeast and to 777.83 m in the southwest, thus slightly sloping southwestward.

The trench was opened in order to ascertain the extension of the monumental mudbrick structures located in the southern half of trench A. This extension of structures was indeed confirmed in trench E as well as in the adjacent trench D. Clearly, the structures continue in the eastern and southern directions.

The major difficulty encountered in trench E (and to a certain degree in D) is the minimal depth of accumulation, basically, no more than 1 m. This means that what was found in this trench was the lowermost parts of the mudbrick structures or their foundation courses. Furthermore, no well-defined occupational strata or floors were found. The possible exceptions are the following: a dubious “floor”, *locus* 24012 (at 777.41-42), and the deposits (from top to bottom) 24003, 24004 and 24007 (fig. 2) which might somehow be related to either the period of construction of some of these structures, or a later, limited/casual occupation, or, better, to the period of disuse of this area. Related to that is the fact that trench E produced a very small amount of finds. Some pottery, unfortunately, mostly of undetermined date, was found associated with the deposits listed above but most of the silty/sandy deposits in this trench were sterile.

Due to all these factors, the phasing of occupation in this trench features the relative chronology based on architectural relationships (abut/abutted, bonding, number of courses in the spot where walls bond/abut) rather than on the examination of ceramic finds in deposits associated with the architecture. As for the absolute chronology, it was attained only through the connection of structures in trench E with those in trench A where the deposits were much more rich in ceramics and where solid deposits featured much clearer association with the adjacent structures.

Phasing of ancient occupation in trenches A and E

The interpretive phasing of the human occupation in trenches A and E proposed here is based on that proposed for trench A in 2008. However, due to the vast increase in the data obtained during the 2009 season, the 2008 phasing is now totally superseded by this proposed below, although the latter is still a subject to potential changes. A phase is defined here as a historical time-period during which a notable change occurred in the excavated area, or if the status of the extant structures or features had been evidently and substantially altered. The occurrence of the next major change marks the end of the phase and the beginning of the subsequent one.¹

The lowermost natural deposits (not phased)

The lowermost strata throughout trench A – *loci* 20015, 20021 and 20030 – are natural alluvial deposits, with their top levels at *c.* 777.15-777.32 m. These can be described as brownish-orange sand with some gravel and silt. All these *loci* were disturbed by the construction of the mudbrick structures in phase 1a, e.g., the foundation courses of mudbrick walls 20008, 20018, 20023, 20025 and 20028 rest directly upon the layers specified above. No cultural material

¹ Some exceptions to this definition are fully justified in the text.

(e.g., sherds) was found in these soil strata.

In trench E, the natural, alluvial deposits are represented by 24013 (top at 777.31-35 m), 24014 (777.10-19 m), 24015 (777.00-12 m), 24019 (777.53 m) and 24020 (777.06-08). All these were sterile, without a single sherd found (fig. 2). All are located below the level of the lowermost course of adjacent mudbrick structure. The only exceptions are locus 24013 (wall 24008 is partially dug into this deposit) and locus 24019, yet the *loci* produced no finds.

Phase 1a. The early mudbrick structures

This phase witnessed a rather sudden appearance of the monumental mudbrick architecture at the site (fig. 6). The exact dimensions and the orientation of the uncovered mudbrick building cannot be ascertained mainly because the entire western part of the structure has been badly damaged and washed away. Furthermore, there is a distinct yet unprovable possibility that the earliest structure at the site is only wall 20008 which would then run roughly north-northeast – south-southwest, possibly into the space of trench C.² This proposition is based on the observation that all adjacent walls – 20035, 20013, 20037, 20018, and possibly 20028 and 20023 – abut wall 20008. However, as this hypothesis cannot be proven, it is assumed that in this phase, wall 20008 indeed continued north and south but was also associated with other mudbrick walls. At any rate, the early building would have been formed by walls 20008, 20018, 20023, 20025, 20028 and 24008 and its very rough dimensions would be *c.* 9 m (north-south) by *c.* 6.50 m (east-west).

This building includes a large rectangular room based on the wide “rampart” (20008). Notably, a large room of similar dimensions exists on the western side of wall 20025, in the space of trench D. It is possible that these two rooms are the elements of the same construction activity, perhaps with some temporal interval but still within the same phase. However, the only evidence which would support this hypothesis is the fact that while the uppermost part of wall 23012 abuts the face of wall 20025, the lower parts of the former seem to enter the structure of wall 20025, i.e., that these walls bond. This evidence does not thus carry much weight. Therefore, it seems more prudent to subdivide phase 1 into subphases a and b, the latter represented mostly but not exclusively by walls in trench D. This phase 1b will be treated as the second stage of the monumental mudbrick architecture era at the site.

The central sector

The main component of this structure is wall 20008 (maximum length at least 3.85 m, maximum width 2.10-2.45 m, maximum height 0.15 m, one or two courses high), running roughly north-northeast – south-southwest. Due to its considerable width, this wall may perhaps be considered a “rampart,” especially if it indeed pre-existed all other structural dependencies. It appears that wall 20008 would have continued southward and beyond the limits of trench A. Similarly, the rampart certainly continued northward, as its remains are clearly visible under the later wall

² However, no traces of this wall have been found in trench C so far.

20003. How far north this wall continued northward cannot be determined. At least up till now, no traces of such were found in trench C (however, see below). What is certain is that the wall was cut at a certain point of time, probably in order to create a northwest-southeast passage (*infra*). At any rate, what is currently left and recognizable of wall 20008 must be considered its lowermost course, i.e., the foundation course of this massive wall.

As for walls 20018, 20023 and 20025, these might, theoretically, have come into existence only in phase 1b. However, it seems more logical to associate these with the construction of wall 20008, thus with the appearance of the monumental mudbrick architecture at the site. Wall 20018 (maximum length 3.33 m, maximum width *c.* 0.61 m, maximum height 0.50 m, three to four courses high) abuts wall 20008. Initially, it was thought that this was a wall of a considerable width – *c.* 1.20 m. However, the excavations of the eastern extension revealed that there are, in fact, two walls there: 20018 (inner, southern) and the parallel, later wall 20037 (outer, northern). As argued below, these two walls cannot be contemporary in construction.

Wall 20025 (maximum length 4.35 m, maximum width 70 cm, maximum height 52 cm, three-and-a-half to five courses high) appears to bond with wall 20018 although these walls feature a different number of courses. The number of coursing in 20025 decreases in the south, being there three to three-and-a-half. This wall features two peculiarities at its extreme ends. In the north, this wall is clearly abutted by the later wall 20037/23003 but the appearance on the top - half-bricks – may perhaps indicate that originally (before the construction of 20037/23003), wall 20025 could have continued further north, being thus parallel to the northward course of wall 20008. This highly hypothetical extension northward of wall 20025 would then have been demolished with the construction of wall 20037/23003. In the south, wall 20025 clearly bonds with the east-west section of wall 20023/24002 and the bottoms of the adjacent sections are on the same level. It thus looks like the builders continued with wall 20025 around the corner, until it reached the eastern end of wall 20023.³ If this indeed is the case, this implies that it was a foregone intention of the builders to construct a room bordered by 20008, 20018, 20025 and 20023, i.e., these all came into existence in the same time.

Wall 20023 (maximum length 2.10 m, maximum width 0.60 m, maximum height 0.55 m, three to four courses high) might have originally bonded with 20008 but currently, it abuts the homogeneous mass of the disintegrated mudbricks (*locus* 20029) which once formed wall 20008. However, this wall bonds, at least in the lower courses, with wall 24008. That wall

³ At this point the peculiarity of walls 20023 and 24002 need to be explained. Both form the same east-west line of a mudbrick wall featuring two rows of bricks. However, the examination of the horizontal seams between the bricks, the vertical surfaces of walls, the numbers and depth of courses and evidence of clear vertical seams may indicate that this continuous east-west wall is, in fact, three different walls. Starting from the west, wall 20023 is 3-4 courses high, 2.10 m long and it clearly ends at the point of its connection with wall 24008. What follows there is the lower, shorter bar of the reverted L-shaped wall 20025 (3 and a half courses high, 1.20 m long) which then ends flush with the line representing the eastern face of wall 20025. At this point, the end of 20025 is abutted by wall 24002 (3.05 m long, 3 courses high). These differences may just represent technical variations in the wall construction but may also have some chronological bearing. At any rate, all three sections described here visually form one, continuous wall roughly running north-northwest – south-southeast.

(maximum length 3.62 m, maximum width 0.60 m, maximum height 0.54 m, four to five courses high) runs north-northeast – south-southwest, i.e., it is roughly parallel in direction to walls 20008 and 20025.

As suggested above, all walls mentioned above would have formed a space of a room, attached to wall 20008 on its eastern side. Additional feature inside the room is wall 20028 (length 1.60 m, maximum width 70 cm, maximum height 15 cm, one course high) which presumably bonds with wall 20008 but abuts wall 20023. This wall might have served as a foundation base for a staircase or a ladder leading up to the upper floor of the room. The interior of the room was occupied by the sterile layer 20030 on which all the mudbrick walls were built and, above it, by 20022, also without finds. The layer 20019 which was on top of 20022, contained numerous finds (pottery, bones, 1 coin and 1 limestone weight) but this *locus* also covered the preserved tops of walls 20023 and 20025. Therefore, there are two possibilities: either the floor level inside the room was higher than the preserved tops of the surrounding walls or the floor inside the room was completely removed once the entire building was abandoned.

Neither of these two hypotheses outweighs the other but one piece of evidence might be brought in support of the latter. Notably, the southern face of wall 20018 features enigmatic irregularities in the coursing. Roughly in the center of the facade, two clear vertical seams from top of the wall to the bottom mark a separated section of the wall which, additionally, has its lowermost course sticking out by *c.* 0.05 m southward. This section is 0.66 m long which, coupled with sticking out bricks, makes an appearance of door with a mudbrick threshold which was blocked at some period of time. The examination of the other, northern face of this wall was impossible due to the fact that it is abutted by the later wall 20037. Thus the evidence is inconclusive but it is at least possible to imagine that the entry to the room in phase 1a was from the north, i.e., in the middle of wall 20018.

The southern sector

In the context of the southernmost part of the excavated area one more structure should be taken into consideration, *locus* 24010 (figs 2 and 7). It is a roughly semicircular⁴ mudbrick structure (maximum length 1.60 m, maximum width 0.80 m, maximum height 0.46 m) which consists of at least two courses of bricks set in a radial pattern. Similarly to wall 24008, the structure seems to stand on the sterile layer 24015. Its function cannot be determined: perhaps a platform or a base of a round building (tower)? At any rate, structure 24010 should most probably belong to the earliest phase of the occupation in the entire area.

The northern sector

It appears that the space east and west of wall 20008 was not actively occupied during phase 1a. Wall 20008 stands directly on top of the sterile layer 20015. However, one interesting feature was uncovered in the western extension of trench A during the 2009 season, i.e., mudbrick

⁴ Most of this structure is beyond the limit of Trench E but it is possible that, in fact, it is a round structure.

wall 20035. This wall, located directly under stone wall 20013/20013W, is running roughly northwest-southeast but not exactly on the same line as wall 20013 on top of it (fig. 8). Probably, these two walls are not contemporary, with the latter seemingly belonging to phase 2. Wall 20035 (maximum length 4.30 m, maximum width 0.50-0.55 m, maximum height 0.24 m, two courses high) consists of two courses of mudbricks and these courses also show considerable deviation in orientation. While in the eastern end the courses vertically overlap, in the western end the upper course runs *c.* 0.10 m further north than the lower one. It is uncertain if this is some kind of construction technique (collapsed face of the lower course?) or if each of these courses represent some separate phase or subphase.

At any rate, wall 20035 represents roughly the same orientation – northwest-southeast – as wall 20018 and later wall 20037. Thus, this mudbrick wall can be considered a predecessor of the southern limit of what became a northwest-southeast passage in phase 3. However, due to the lack of any datable material associated with this wall, it is hard to place it in any chronological scheme. What needs to be mentioned is that wall 20035 seems to stand on the lower sterile layer 20021 as opposed to wall 20008 which stands in the upper sterile layer 20015 in this area. The relationship between these two walls is also unclear. There is a clear gap – *c.* 0.13 m – between them, and the lowermost course of bricks in 20008 is not on the same level as the upper mudbrick course of wall 20035.

It is worth to note that mudbrick structures, apparently early, also occur in trench C which borders with trench A in the north. While it is postulated here that wall 20008 continued northward, so far no traces of it were found in trench C. Conversely, neither of mudbrick walls from trench C seem to extend into the northern sector of trench A. This may indicate that there was some sort of a limit between structures in these trenches and if so the best candidate would be a hypothetical extension westward of wall 21025/21002/21007 in trench B (see the report of this trench for details). This wall must indeed be considered as one of the earliest walls in the area. If this hypothesis is correct, walls 20008 and 21025 (or its predecessor) would have formed a large letter T with its horizontal bar looking northward. At any rate the foundations of wall 210025 in trench B lay on the equivalent of the sterile layer 20015 or even 20021 in trench A. Its general northwest-southeast line will be continued in the following phases by wall 20002.

Dating

The dating of phase 1a faces considerable difficulty. As mentioned above, the remains of the early mudbricks structures are not associated with any floors or occupational deposits. The only datable material relates, in fact, only to phase 2. It comes from the fill, *locus* 20012 and it generally dates to the second half of the 1st century BC – very early 1st century AD. Considering the general rapidity of the evolution of occupation at the site, accompanied by the appearance of the monumental architecture, which will be further developed in phase 2, it would seem that the time-span between both phases was not substantial. Therefore the general dating of phase 2 should provide a *terminus ante quem* for the dating of phase 1. As such it is suggested that phase

1a should be roughly dated to the mid-to-later 1st century BC.

Phase 1b. Additions to the early mudbrick structures

The walls and structures described here may or may not have been built already in phase 1a. With the exception of wall 23012 which seems to be bonding with wall 20025, all other walls about the structures described in phase 1a.

Most of the walls specified here are located in trench D (fig. 9) thus only a brief presentation will be provided. Wall 23012 (three courses high) follows the same orientation – northwest-southeast – as wall 20018 in trench A. Wall 23012 probably bonds with wall 23011 (three 3 courses high). The latter runs northeast-southwest and within the limits of trench E is designated as 24005 (in trench E: maximum length 3.10 m, maximum width 0.58-0.60 m, maximum height 0.40 m, three courses high). In turn, wall 24005 is abutted by wall 24002 (maximum length 3.05 m, maximum width 0.60-0.630 m, maximum height 0.40-0.48 m, three courses high) which then abuts the southernmost part of wall 20025 (see footnote 1).

Together with wall 20025, these three walls form a room of dimensions comparable with that described in phase 1a. Inside this room, two walls, 23016 and 23013/20031 form a small rectangular enclosure within which an enigmatic installation was set (for details, see trench D report). Whether these walls were built in the same time as 23012 and 23011/24005 or later, cannot be determined. Wall 23013/20031 is also a puzzling feature (in trench A: maximum length 0.89 m, maximum width 0.80 m, maximum height 0.20 m, two courses high). This wall appears to abut wall 20025 on its eastern side, continuing in the southeastern direction as if forming a wider surface (floor?). However, its continuation in trench D is a straightforward wall (23013) two rows wide and two courses high. It is possible that these differences may have something to do with the oven 20026 situated in the corner between walls 20025 and 24002. If wall 20031 was initially a mudbrick surface, it is possible that it was later cut in a semicircular fashion to accommodate the installation of the oven. Both the oven and the wall stand on the sandy sterile layer 23019/24019/20027.⁵

In the southernmost part of the excavated area no radical change can be discerned. Similarly to the semicircular structure 24010, the new walls 24002 and 24005 stand on the sterile deposits 24014 and 24015

At any rate, the combined phase 1a-b witnessed the appearance of a monumental mudbrick design which consisted of a massive wall (20008) in the west, which formed the “backbone” of two large rooms located side by side in the eastern direction, and an even larger enclosed space located to the south of these rooms and enclosed by walls 20025, 24002, 24005 and 24008. While new mudbrick walls will also have been constructed in phase 2, it seems that

⁵ Unfortunately, the oven 20026 is located in the corner between three trenches; A, D and E. While the larger part of oven was in Trench A, its enclosure and surrounding installations were located mostly in Trench D and, to a certain extent, in Trench E. This situation produced considerable difficulty in the proper recognition, assignment of and the concordance between the loci recognized in these trenches.

phase 1 was the major time-period during which the mudbrick constructions were predominant (figs 10-11).

Dating

In light of the phase 1a dating discussion presented above, phase 1b, if not contemporary, should be dated slightly later, i.e., to the later 1st century BC. The date of the combined phases 1a-b would then be suggested as the mid-to-late 1st century BC.

Phase 2. Early stone structures and channel 20014

While the occupation would have continued in the multiroomed mudbrick structure which occupied the spaces of trenches A, D and E, important development took place in the northwestern part of trench A and in the adjacent trench C – the construction of wall 22006 and the early wall 20002. Wall 22006 running north-northeast – south-southwest is the most impressive monumental structure at the site (see trench C report). It is postulated that in phase 2, this wall was built together with wall 20002W forming a southeast corner of a large, unknown room or building the interior of which stretched northwestward. In the same time, the water channel 20014 was most probably built running parallel to wall 22006 and c. 0.50 m away from it (fig. 12).

The sequence of events related to these two walls and the channel 20014 is complicated and in order to explain the proposed phasing, it is necessary to describe the extant appearance of wall 20002 and its composite character.

Early wall 20002

Currently, this wall appears as a uniform structure but a close examination suggests a composite, multi-phased history. Generally, this wall can be divided into three elements: the deep foundations of the early wall (20002W) located to the west (hence termed western part), the high foundations of the later wall (20002) located to the east (hence termed eastern part) and the superstructure which is equally later but common for both walls, i.e., it runs uninterrupted from the westernmost end of wall 20002, *as currently seen*, to the easternmost part which abuts the pier 20017. The entire wall is 5.85 m long. The western part, which is postulated to be built in phase 2, bonding with wall 22006 and forming a corner, is *currently* represented only by the original extremely deep foundations consisting of five to six courses of roughly hewn large stones, c. 2.45 m in length and of the total depth exceeding 1.15 m.⁶ These foundations which cut through the sterile layers 20015, 20021 and went further down, clearly begin at the height (c. 777.30-35 m) comparable with the top of the foundations for wall 22006. Furthermore, the deep foundations of 20002W do not continue eastward beyond the vertical line marked by the eastern face of wall 22006 (fig. 13). This indicates that the original corner of these two walls was indeed there.

⁶ The bottom of the foundations could not be reached because of the danger of collapse of the entire wall. The excavations stopped at 776.25 m.

Directly east of the deep foundations of 20002W the soil layer 20015 (and 20012 above it) continues for *c.* 0.40 m but then it is cut by the trough of channel 20014 (*infra*). The bottom of the trough is more or less at the same level with the top of the deep foundations of 20002W. On the eastern side of the channel there is the foundation trench of the channel (part of *locus* 20012). Then, continuing eastward, one encounters the three courses of the foundations for (later) wall 20002 (fig. 14). These foundations have its top approximately at the top level (777.60-65 m) of the trough rather than its capstone embedded in the wall. The top course of the foundations features stones sticking out from the face of the wall for *c.* 0.10-0.20 m. All that has been described so far is then topped by the superstructure of wall 20002 which, as mentioned above, stretches over the deep (early) foundations, continuing over the channel 20014 and encasing it and then over the foundations of wall 20002 (eastern part). This superstructure features three (or four) courses of smaller, relatively regular but poorly hewn stones.

Initially, it would seem reasonable to propose the following scenario for wall 22006, the entire *extant* wall 20002 and the channel 20014 – all these elements were built in the same time. The differences in depth and massiveness of the foundations for the western and eastern parts of wall 20002 could, theoretically, be explained on the basis of different function of the western part, as bonding with equally massive and deep wall 22006 versus the eastern part as encasing the channel 20014 and not requiring deep foundation.

However, it may be more prudent to see these differences in chronological rather than functional terms. Specifically, it is postulated here that in this phase, only wall 22006 and the western part of wall 20002 were built, the latter *currently* represented only by its massive foundations. Furthermore, channel 20014 was also built then but probably encased in some predecessor (*infra*) of *current* eastern part of wall 20002. The following arguments are put forward in support of this hypothesis:

1. The difference between the eastern and western foundations (*c.* 0.35-40 m versus more than 1.15 m) are too considerable in terms of depth and construction manner to be just functionally explained;
2. The top of western foundations is 0.30 m lower than the top (= the course of sticking stones) of the eastern foundations. Even if the ground in the area gently slopes down westward, this difference is considerable and implies that these foundations better conform to the realities of different phases represented by different level of ground;
3. The superstructure of both western and eastern parts is relatively homogeneous and does not show any significant vertical division between these parts, even in the area of the channel;
4. The appearance of the masonry of this superstructure is so markedly different (inferior) from the appearance of wall 22006 as to make their contemporaneity highly unlikely. As such, the entire superstructure must belong to a phase different than the period of construction of walls 22006 and 20002W (currently represented only by the foundations);
5. It is certain that wall 20008 continued further north from the place where it currently ends

and it is highly probable that this wall did not reach the interior of trench C. Therefore, wall 20008 must have ended somewhere north from the place where it currently ends. The wall of such size could not just end as a free-standing structure. Therefore, wall 20008 must have abutted/had been abutted by an entity running northwest-southeast and being other than the *extant* eastern part of wall 20002 (both high foundations and its superstructure). Since there is no compelling reason to see the cutting of wall 20008 already in this phase (in fact the opposite is compelling), its existence (and continuation northward) excludes the existence of 20002 eastern part *in its current form*. As such the entity that must have been abutted by wall 20008 must be some predecessor of the *current* 20002 (eastern part).

Admittedly, such scenario is speculative yet not impossible and generally fitting most of the available evidence. It would also mean that channel 20014 would have to have been encased in some kind of wall. At this point of time, the structures in trench C must also have been limited by some kind of a barrier in the south and again, either a (stone? mudbrick?) predecessor of wall 20002 (eastern part) or a westward continuation of wall 21025 must have served this purpose. The latter possibility is more attractive. The construction of stone walls 22006 and 20002 (western part) would have accorded possibility of cutting the westernmost end of such hypothetical wall and encasing the channel in it.

Channel 20014

This channel is considered to be an integral part of activities of phase 2, associated with the construction of walls 22006 and 20002 (western part) and encased in a northwest-southeast wall, be it a predecessor of 20002 (eastern part), 21025 or any other barrier. The limestone-built channel is slightly dug into the sterile layer 20015. The area of the cut, i.e., around and along the channel, presumably up to wall 20008 (i.e., eastward) was filled with soil layer 20012. The ceramic contents of this *locus* imply a limited occupation.

The northern part of the channel runs northeast-southwest, i.e., basically parallel to the presumed northward course of wall 20008 and wall 22006 in trench C. This part of the channel consists of a monolithic trough 0.74 m long, *c.* 0.30 m high and with the internal measurements of the trough being *c.* 0.20 m in depth and 0.20 m wide. Currently, the northern end of the trough is encased in the structure of what is postulated to be the (later) superstructure of wall 20002 from phase 3a (*infra*). This type of a trough-like monolithic water conduit is usually associated with capstones. None, however, were found. Either these were removed when the channel went out of use (phase 3b) or the channel never had any capstones which is less likely but not impossible.

However, at the southern end of the monolithic trough, the course of the channel is radically changed into west-southwest (fig. 15). The part which turns *c.* 70-80 degrees west from the original course – a shallow monolithic trough – is mortared to the early trough and is also of somewhat different dimensions (maximum height 0.15 m, internal width of the trough 0.22 m, internal depth of the trough 0.04 m). Originally, it was thought that this composite character of the channel and the drastic redirection of its course should have some chronological significance,

i.e., two parts of differing construction and direction representing two different time-periods. In the first period, the channel was running northeast-southwest and then was redirected into west-southwest either within the limits of phase 2 or later. If originally running southwest the channel would have run against the mudbrick wall 20035 which lay on the same level (and deeper) than the presumable southerly course of the channel. Much also depends on the chronological placement of wall 20013 (*infra*) which was presumably constructed in this phase on top of the mudbrick wall 20035.

Notably, as seen in trench C, channel 20014 features a rather steep gradient for such type of channels and any drastic redirections are not advisable in such channels. Naturally, it is also possible that the added part represents some kind of later modification or repair. At any rate, the channel was either redirected or always had a bent course. Neither proposition is particularly favoured here. What seems certain is that function of the channel was probably reduced in subsequent phase (3a) with the partial dismantling of its western course.

Currently, the top of the channel significantly protrudes over the top of layer 20010 (probably, lower part), a soil layer which accumulated now and/or in the following phase on top of *loci* 20012 and 20015 throughout the area west of wall 20008. If the capstones were there originally, these would thus be above layer 20010 and easily accessible for removing and clearing the trough. Ceramics and objects found in layer 20010 indicate a limited occupation.

Wall 20013 and feature 20034

Wall 20013 – a stone construction of two parallel rows of uneven stones (maximum length 4.30 m, maximum width 0.62-0.70 m, maximum height 0.18 m, one course high) is another enigma which cannot be safely placed within the chronological scheme of the area (fig. 16). This wall lay directly on the uppermost course of mudbrick wall 20035 and it is uncertain whether wall 20013 is the contemporary with the former (= its stone superstructure) or represents a later modification roughly but not exactly of the same orientation. Furthermore, wall 20013 is not in the same line as the later wall 20003 nor it shows the same course as the major mudbrick walls in the area, i.e., 20018/23012 and 20037/23003.

Nevertheless, wall 20013 must also belong to a relatively early occupation reality in the area as it seems integrated with wall 20008 by means of feature 20034. This is a particularly peculiar connection. Wall 20013 runs southeast as if to abut the western face of wall 20008 yet it does not, similarly to mudbrick wall 20025 below, touch this face (fig. 17). It stops c. 0.10 m before effecting the actual abutment. This might be a specific construction method in case of a stone construction abutting a mudbrick construction or vice-versa. Instead, a semicircular feature made of hard clay was built in the northern corner of the connection which encases the courses of both walls 20035 and 20013 connecting these to 20008. Although, later on, wall 20008 was cut exactly at this point, it appears that in phase 2 it was still standing high and presumably continuing northward from this connecting point.

Northeastern sector

While first stone constructions were built in the northwestern sector, new mudbrick walls were added to the existent ones in the northeastern sector. These include wall 20037 (maximum length *c.* 1.84 m, maximum width *c.* 0.60 m, maximum height 0.37 m, three courses high) and installation 20036 within limits of trench A and walls 23003 and 23010 in trench D (see fig. 9). All three walls – 20037, 23003 and 23010 – run parallel to the early mudbrick walls 20018, 23012 and 23011/24005 respectively, practically abutting these walls all along their faces (fig. 18). The end-result is one massive mudbrick L-shaped wall, *c.* 1.20 m thick, which now encloses the entire central-eastern part of the area, including both rooms described in phases 1a-b. This wall runs northwest-southeast, with walls 20037 and 23003 being external, northern component, and walls 20018 and 23012 being the internal, southern component (fig. 19). Upon turning the right angle (where walls 23003 and 23010 bond) to run in southwest direction, the wall 23010 is the external, eastern wall and walls 23011 and 24005 are the internal, western component. Notably, wall 23010 does not have its southerly continuation in trench E; either it was never there or was completely demolished.

The face-abutting is not perfect between these walls. While 20037 was built strictly abutting the face of 20018, the walls 23003 and 23012 are very close to each other (although not technically abutting) only in the west. Continuing further eastward, a gap occurs between these walls and it widens to the effect that at the eastern end it is *c.* 0.15 m wide requiring an additional single row of mudbricks in-between these walls (fig. 20). Similarly, there is a consistent gap of *c.* 0.05-0.10 m between walls 23011 and 23010, filled with sand. The gap can be easily explained. Old mudbrick walls 20018 and 23012 while roughly running northwest-southeast are actually not on exactly the same line: wall 23012 runs a more southerly course. These two walls were probably not built in the same time but in phases 1a and 1b respectively. On the other hand, the new walls 20037 and 23003 form a single, continuous and consistent northwest-southeast line.

However, the reason behind these new constructions is not readily apparent. If walls 20018 and 23012 were already destroyed or seriously damaged, new walls should have been built on the cleared area where the old originally stood and not built abutting face-to-face with the ruins. Thus walls 20018 and 23012 must still have been intact and in use. Another possibility would be that the new walls 20037 and 23003 were built to delimit the northwest-southeast passage which indeed later on existed in the northern part of the area. This possibility, however, appears impracticable. Walls 20018 and 23003 have already formed a southern limit of a “passage” and the addition of new walls would only reduce the width of such passage by *c.* 0.60 m. It is unlikely that such considerable investment would have been made just to improve the visual perspective of the “street.” Finally, it is assumed that new wall 20037 was built when wall 20008 was still in use and stood to a considerable height. It is unlikely that 20037 was built abutting a one course-high “rump” of 20008 as the latter became in the following phase (3a).

Therefore, one must assume that new walls discussed in this section were built when all other mudbrick walls in the area were still relatively intact and in use. Accordingly, the reason for this considerable strengthening of the northern and eastern sides of the two rooms in trenches A and D must have something to do with the nature of occupation in these rooms rather than with the delineating of the northeast-southeast passage although the latter became a “by-product” of this development. Yet, why these rooms required such considerable reinforcing is unknown.

Installation 20036

In fact, the westernmost part of new wall 20037 which directly abuts wall 20008 is installation 20036.⁷ It is a stone construction, 1.36 m long, *c.* 0.73 m wide and *c.* 0.30 m high in three courses, consisting of relatively well-cut stones, almost ashlar. At least one is *c.* 0.75 m long and 0.10 m high. The coursing corresponds horizontally with the coursing of the mudbrick section further east, i.e., both parts, stone and mudbrick, of wall 20037 are fully integrated. In phase 3a, *locus* 20036 became a convenient substructure for the basin installation 20005 and its stone base (fig. 21).

However, the function of *locus* 20036 in phase 2 is more difficult to ascertain. It is possible to suggest that this stone end of wall 20037 served to achieve a more firm abutment against wall 20008. So far, the author of this report has not noticed any other such constructions at Madâ'in Sâlih but these are not improbable. On the other hand, the appearance of *locus* 20036 does not exclude a possibility that this stone section was built only in the following phase (3a) when wall 20037 was presumably damaged (?) and demolished to the existent height of three courses. It is technically possible that only then the westernmost section of wall 20037, which initially would have abutted wall 20008 (now also demolished and cut) was completely removed and the stone section 20036 inserted. If this scenario is correct, such insertion would have been made specifically with the thought of installing the basin 20005 with its base on top of *locus* 20036. The evidence does not favor any of these specific possibilities; either *locus* 20036 was installed in phase 2 or in phase 3a.

The northern area – summary

With wall 20008 still in use and still running northward, the major changes in phase 2 resulted in two well-defined spaces on the western and eastern sides of that wall. The western space, with channel 20014 inside, was now enclosed by walls 20008 in the east, wall 20013 in the south and on the northern side by wall 20002W and a predecessor of wall 20002 (eastern part). Concurrently, the eastern space of the northern area was now enclosed by walls 20008 in the west, walls 200037/23003 in the south (fig. 22) and presumably by wall 21025/21002/210007 (or its predecessor) in the north. Whether any door or gate existed in wall 20008 to allow for communication between the western and eastern spaces cannot be ascertained.

⁷ This feature cannot be visible on the top-plan of trench A as overlaid by the installation 20005. But it is visible on the northern elevation of walls facing the northwest-southeast passage on the southern side (fig. 39).

Incidentally, whether or not intentionally, the development in phase 2 created a situation in which the demolition of the northern part of wall 20008 would have created a single, uninterrupted passage running northwest-southeast in the northern area, which would have been well-delineated by the already existing walls on both the southern and northern sides. This, however, required a stimulus to “open” such passage and further delineate it by the construction of walls 20003 and 20002 (eastern part) in phase 3a. As is postulated below, such stimulus might have been provided by some kind of destruction.

The southern sector

As apposed to the northern sector of the excavated area, the southern sector does not provide any significant information concerning the phase 2 occupation there. Soil deposits which accumulated against and between the extant walls there but did not cover these might reasonably be associated with some kind of occupation there although, as mentioned above, these might as well represent later periods of disuse and abandonment. To these belong *locus* 24003 east of wall 24005 and *loci* 24007 and 24004 between walls 24005 and 24008 (see fig. 2). All these are generally sandy-silty deposits, often with some clayish patches and small accumulations of ash. *Locus* 24004 additionally covered the remains of the enigmatic semicircular mudbrick installation 24010. Generally, it is difficult to chronologically place these soil *loci* but at least the limited number of datable sherds – mostly cooking pots and storage jars – found there may provide some general indication. *Locus* 24003 provided material datable to the late Hellenistic to early 1st century AD. *Locus* 24004 yielded a painted bowl dated to the end of the 1st century BC – early 1st century AD.

Some kind of a small-scale development might be observed in the southwest corner of the excavated area (fig. 23). There, the pre-existent wall 24008 is abutted by wall (or pavement?) 24011 (maximum length 0.65 m, maximum width 0.37, maximum height 0.14 m, one course high) which runs northwest-southeast (fig. 24). This wall on its northern side is abutted by a hard clayish surface 24012 (maximum length north-south is *c.* 1.85 m, maximum width east-west is 0.53 m, *c.* 0.02-0.03 m deep, elevation *c.* 777.41 m). Unfortunately, neither the soil deposit below this surface (24013) nor above it (24009) provided any datable ceramic material.

Dating

The ceramic material found in layer 20012 and at least lower part of 20010 dates to the 2nd half of the 1st century BC – very early 1st century AD. Combined with the material from soil *loci* in the southern section of the excavated area, phase 2 should most probably date to the late 1st century BC – early 1st century AD.

Phase 3a. Destruction (?) and rebuilding

The following time-period saw some major changes in the occupation of the area of trenches A and E. These included the partial destruction (?) or partial demolition and levelling (?) of the mudbrick structure consisting of walls 20008, 20018, 20023, 20025, 20037, 24002, 24005,

24008, 24011, the construction/reconstruction of walls 20002 and 20003 and the utilization of the space between these walls as a passage running northwest-southeast. The situation is less clear in trench D but it seems that the mudbrick walls there (23003, 23010, 23011, 23012, possibly 23013 and 23016) experienced the similar fate. Possibly, the demolition and the new constructions were the components of one and the same activity followed by the occupation of the northwest-southeast passage. For purely practical reasons, this phase is subdivided into 3a and 3b, the former being the demolition and new construction and the latter being the actual occupation of the passage. Chronologically, 3a is the beginning of the longer time-period designated here as 3b.

Destruction (?)

One of the most striking features at the site is the fact that basically all of the mudbrick structures from phases 1-2 are preserved to the same level.

The relative inexperience of the excavator in working with mudbrick architecture might be responsible for exposing the structures to a certain, artificial level. Moreover, it is evident that the exposed ruins of the mudbrick structures would have been subjected to major erosion and possible flooding which would have artificially levelled out the extant tops of the walls (*infra*). Nevertheless, it is symptomatic that currently, all mudbrick walls more or less represent the same (within 10-20 cm) level: e.g., 777.54-62 m for wall 20008, 777.68-71 m for wall 200018, 777.52-58 m for wall 20023, 777.69-73 m for wall 20025, 777.51-54 m for wall 20028, 777.59-63 m for wall 24002, 777.61-65 m for wall 24005, and 777.44-56 m for wall 24008. Also, stone wall 20013 seems to have been (naturally or intentionally) levelled down to 777.51-54 m.

Generally, it is possible although not fully proven, that at least some walls had been subjected to some sort of artificial levelling at least in some parts, which apparently was then much enhanced by natural phenomena. The prime candidate is wall 20008 which is not only cut in its northern part but must have been at least partially levelled to accommodate new wall 20003. Some levelling must also have taken place in the western end of walls 20018 and 20037 where a stone basin (*locus* 20005) was inserted on top of the remaining courses of these walls. One wonders if such levelling and cutting would indeed be practicable if not preceded by some kind of limited destruction which affected the mudbrick superstructures and thus facilitated the changes in phase 3a.

Furthermore, one place where indeed some possible destruction and subsequent reconstruction took place is the early wall 20002. As pointed out above, its entire superstructure and most probably the foundations of the *extant* eastern part display considerable difference when comparing with the *extant* foundations of 20002W and the appearance of wall 22006. It is impossible to state with any certainty what really happened there between phases 2 and 3 but, following the suggestion above, there must have been a predecessor of the eastern part of wall 20002, which encased the course of channel 20014. This predecessor was either intentionally demolished or, more likely, was seriously damaged in some sort of disaster and then completely rebuilt in phase 3a.

One might speculate about the nature of such potential disaster. In case of a seismic destruction, in addition to the characteristic partial or total directional collapses of walls, arches, roofs and structural supports, the tilting of walls and structures, tensional cracks and joints in walls and foundation courses, and shearing of the still-standing pillars and columns should also be observed.

However, the structures at the site were up to Phase 3 were mostly mudbrick-built. Such, as more flexible, would have been relatively less affected by seismic tremors yet their superstructures (upper parts of walls, roofs) might have collapsed. The ancient seismic activity in the region of Madâ'in Sâlih is not known yet cannot be excluded. Again what is postulated here is not a major disaster but rather a minor episode.

Such possible minor destruction could have provided a stimulus for changes and restorations. However, it is equally possible that the human agency is totally responsible for the changes in phase 3, i.e., some walls were intentionally levelled, demolished, removed or modified because of some conscious decision-making requiring new designs or arrangements.

Demolition of wall 20008

As suggested above, wall 20008 could, theoretically, have suffered some kind of damage and as a result, it was demolished and its northern part cut and removed. The demolition went down to the level of layer 20010, i.e., to *c.* 777.50-54 m, which would also have been slightly lower than the level of the (not preserved) capstones of channel 20014. At the same time, its entire northern section, up to the point where it presumably abutted the east-west running predecessor of wall 20002, was cut and removed (fig. 25). That predecessor could also have been damaged (?) and completely removed (*infra*).

The selected southern line along which wall 20008 was cut was not accidental. On the western side, this line corresponds to the northern limit of the clay feature 20034 which originally bonded walls 20035 and/or 20013 to wall 20008. On the eastern side, the cut line does not correspond to the line represented by the northern face of wall 20037. Instead, there is a curious inset, i.e., the remains of 20008 stick out for *c.* 0.20 m northward from the face of wall 20037.⁸ Again, this is not accidental. The depth of the inset corresponds to the length of the projecting spout of the water basin 20005 which would then have been inserted on the top of the remains of wall 20037. The inset serves to protect this projecting element of the basin. This all indicates that the activities described in this phase were not isolated but rather an intentional and concerted program of changes in the northern sector of trench A.

Wall 20002 and pier 20017

The general description and the composite character of wall 20002 have already been presented in the section on phase 2. It was also suggested there that in that phase, some kind of its predecessor must have existed, which encased channel 20014. It is further suggested here that

⁸ This inset is barely visible on the top plan because it is largely overlaid by the installation 20005.

if there was a destruction at the end of phase 2, it could have damaged the superstructure of the western section of this wall (= 20002W) and the predecessor of the eastern section, whatever its form would have been. It may, however, also be that even without a compelling reason of destruction, wall 20002 had undergone very substantial reconstruction in phase 3a. This, for example, might be related to the demolishing of the northern section of wall 20008 which certainly took place with or without the agency of natural destruction. Whatever the reasons and causes, the new components of wall 20002 which were built in this phase are the foundation course of the eastern part of the wall and the entire superstructure which runs over the old deep foundations in the western part, encases the channel 20014 and runs over the new foundations of the eastern part (fig. 26). What follows here is the additional description of the wall, as it now appeared in phase 3a (and currently is).

Altogether, wall 20002 is *c.* 5.85 m long (3.40 m its eastern part) and its width is *c.* 0.70 m on the average (fig. 27). The maximum height of the wall, including the foundations, is more than 1.70 m (western part) and 0.65-78 m (eastern part). The superstructure throughout features three to four courses, excluding the foundation courses. The foundations of the eastern part are *c.* 0.35-45 m deep (in three courses), the uppermost course featuring stones sticking out from the face of the wall for *c.* 0.1-0.20 m.

The stone material used varies from large, rather irregular stones in the western part, through smaller more regular ones in the central part and a haphazard collection of much eroded smaller blocks in the eastern end. In the eastern part, i.e., east of the channel, the wall's foundations rest on the equivalent of 20010, although this could not be fully ascertained because the soil there must have been much disturbed. At any rate, the eastern part of the wall, in its *extant* form would have been built only after the deposition of soil layer 20010 and the levelling of rampart 20008.

On the eastern extremity of wall 20002, a somewhat curious feature is present. It is a square (0.83 x 0.82 m) "pier," *locus* 20017. This pier is *c.* 0.60 m high and it features a surprisingly regular masonry, four courses high. The entire construction must stand on top of the presumed predecessor of wall 20002 and perhaps, partially, on the levelled westernmost extremity of wall 20008. Curiously, the pier shows a slightly different orientation than the wall 20002 which the pier is currently the end of. Also, the east end of wall 20002 seems poorly fitting in the space where it abuts pier 20017. Initially, it was thought that the pier was an enlarged end of wall 20002, forming the western part of some sort of a "gateway" which would have had north-south orientation. However, there is hardly any space left between the pier and the mudbrick wall 21025. That mudbrick wall may have had some relationship with the predecessor of wall 20002. Notably, the obvious irregularities, poor connecting and lack of exact, common orientation, as visible in the eastern end of wall 20002, pier 20017 and mudbrick wall 21025 are occurring exactly in the area where wall 20008 would have abutted the predecessor of wall 20002 possibly in phase 1 and certainly in phase 2.

Channel 20014

As currently seen, wall 20002 totally encases the channel 20014 in its structure. The channel's trough is capped by a very large, single block, followed by thinner but equally large stones further up. If the eastern part of wall 20002, as it currently appears, was built only in phase 3a, as suggested, it is evident that the channel 20014 must still have been in use since it was carefully encased in the structure of the wall allowing the water to flow southwards.

However, the excavations of trench A western extension in 2009 revealed that the “bending” section of the channel, which turns to west-southwest does continue only for a few centimeters beyond the original limits of trench A. Further on and in the same direction, is a band (*locus* 20014W) of very silty material with small pebbles, clearly distinguishable from the surrounding hard-packed soil layer 20010 (lower). This band, apparently a bedding for the stone trough of the channel, and, in part the fill of the foundation trench for the channel, must therefore partially equal *locus* 20012 evident directly east of the northeast-southwest section of the channel which is still *in situ*. The band is *c.* 0.30-35 m wide and it continues in west-southwest direction for *c.* 2.37 m, i.e., until the limit of the western extension (fig. 28). The careful excavation of this band revealed that it rests on the sterile soil 20015.

All this indicates that channel 20014 was still in use in phase 3a but its function might have somewhat changed. While the channel still discharged some liquid toward west-southwest, its stone trough was largely dismantled. It is highly significant that at least one well-defined section of the trough – presumably from channel 20014 – is currently serving as a building stone on top of wall 20002 (eastern part). This may indicate that the dismantling of the west-southwest running trough took place just before or simultaneously with the construction of wall 20002 (eastern part). Presumably, the channel served now as a drain discharging liquids into the westernmost part of the northwest-southeast passage which, in this phase must have served as a convenient disposal of debris. *Locus* 20010 (upper part) which covered bedding 20014W contained quantities of broken ceramics.

Wall 20003 and installation 20005

Another wall – 20003 – was constructed in the distance of roughly 2 m from and parallel to wall 20002. Wall 20003 is both poorly preserved and relatively low thus perhaps the term “wall” is a misnomer. It may be that it served only as a low enclosure which delineated the northwest-southeast passage and separated the occupation area from the now largely abandoned (?) area of the mudbrick structures. Wall 20003 is *c.* 2.82 m long and only 0.45-50 cm wide, with the maximum height of 0.44 m in two courses. Again, the location of wall 20003 is not accidental. For *c.* 2.10 m of its length, wall 20003 stands directly over the demolished wall 20008, and its northern face is flush with the edge of the mudbrick wall. The remaining length is on top of layer 20010. Undoubtedly, wall 20003 serves to better delineate the northwest-southeast passage which came into being in phase 3a. The fact that wall 20003 was built in line with the edge of cut wall 20008 and not in line with wall 20037 further east, once again implies that wall

20008 was cut only in phase 3a.

The proposition that this wall was never much higher than its extant form may also be supported by the fact that at its easternmost end there is a large stone water reservoir or tank, *locus* 20005. This installation is again clearly a part of the interrelated and interdependent activities of phase 3a and thus its location may not be accidental. *Locus* 20005, consisting of two parts, rests directly on the stone substructure 20036. As mentioned in the description in phase 2, this stone construction might have been the connecting element between old wall 20008 and new wall 20037. If so, wall 20037 could have suffered some kind of damage at the end of phase 2/beginning of phase 3a and it was levelled down to the lowermost three courses, including the stone section 20037 which directly abutted wall 20008. This stone section would now conveniently serve as substructure for installation 20005. However, an alternative scenario would suggest that wall 20037 was indeed levelled down and completely removed in the area of abutting wall 20008 and in this space stone base 20037 was inserted. In such case, *locus* 20037 would be directly associated with installation 20005 and with phase 3a.

At any rate, directly on top of substructure 20037 is a stone plinth or base, *c.* 0.18 m thick, which is also partially resting on a stone from wall 20003 confirming the contemporaneity of *loci* 20005 and 20003. On top of the plinth there is an almost square, monolithic basin with low-preserved walls, which has a stone spout projecting northwards. The basin is *c.* 1.26 m long (including the spout), *c.* 1.06 m wide and *c.* 0.40 m high, including the plinth. As mentioned above, it must have already been planned at the time when wall 20008 was cut that the basin with projecting spout would be placed there and its spout protected by the inset between walls 20008 and 20037. Otherwise, wall 20008 could have been conveniently cut flush with the line represented by the northern face of wall 20037.

The function of installation 20005 is difficult to discern. Generally, although the installation 20005 might appear to be a settling tank or a public water distributor used in connection with the northwest-southeast passage, the basin does not seem to have any permanent water supply line and is quite shallow (even if its walls must have eroded) to keep any substantial amount of water. More likely, water was brought into the basin, some kind of washing, mixing or other processing activity was conducted inside and the excess of liquid was poured out through the spout.

Early occupation in the northwest-southeast passage

With the cutting and removing of the northern segment of wall 20008 and the reconstruction of wall 20002 in its current appearance, the communication was now uninterrupted between the western end of trench A and the eastern end of trench D, i.e., the northwest-southeast passage came into being. *Locus* 20010 was the surface all along the passage and the limited occupation there is exemplified by a fireplace, *locus* 20009 located on top of 20010. It consists of four larger stones, roughly arranged in a circle (diameter *c.* 0.57-60 m), and the fill of very ashy soil with charcoal fragments. Also, large quantities of animal dung mixed with straw were found

within the limits of the fireplace indicating that, in addition to wood and twigs, dried dung was also used as fuel. It is tempting to associate this short-lived fireplace with the work conducted in the western part of the newly created passage, probably related to the construction of wall 20002 (eastern part).

Dating

In addition to dating provided by the ceramic material from layer 20010 (late Hellenistic, second half of the 1st century BC – very early 1st century AD), the sherds associated with fireplace 20009 produced a general date of the 1st century BC – 1st century AD. Thus the activities associated with phase 3a can be roughly dated to the early 1st century AD, probably its first early decades.

Phase 3b. Occupation of the northwest-southeast passage

Resulting from the major changes which occurred in the area of trenches A, B and D in phase 3a, there was a northwest-southeast passage which is limited by walls 20002, and 21025/21002/21007 on the northern side and by walls 20013 (?), 20003 and 20037/23003 on the southern side (figs 29, 38, 39). Wall 20013 is problematic. It may or may not have been levelled in phase 3a and if former, it would have formed in phase 3b only a low enclosure.

The northwest-southeast passage

The passage was associated with hard-beaten surfaces (20010 and later 20007) and with some sort of processing installation 20005. Whether the passage was some kind of a communication route between outlying parts of town or simply served as means of local access is unknown. Judging from the image on the geophysical map, the passage seems to have continued for a considerable distance. However, it does not seem that this passage was frequently used. While layer 20010, with its hard-beaten surface, yielded a considerable quantity of sherds, the layer directly above – 20007 – is neither deep nor rich in finds although also possessing a hard-beaten surface. In addition to ceramics, this silty *locus* also produced animal bones.

Definitely, *locus* 20007 entirely sealed channel 20014, i.e., the portions of the stone trough which were still *in situ*. For unknown reasons, all capstones, if ever present, were removed but even if found *in situ*, these would have been totally under the surface of 20007. For all purpose, the functioning of the channel cannot be confirmed beyond the end of phase 3b and most probably, it ended already during its time-span.

The southern sector

Whether the entire space south of the passage was by abandoned is debatable. As proposed before, some walls might have been either damaged by the postulated destruction event, or levelled, or both. Other walls and spaces might still have been in use. There is a significant lack of finds or occupational surfaces in the central and southern space of the excavated area. However, *locus* 20019 which covered most of the preserved tops of mudbrick walls in the central sector of the excavated area yielded pottery probably datable to no later than the end of

the 1st century BC/beginning of the 1st century AD. Therefore, it is possible that much of the central and southern sectors of the excavated area was indeed abandoned or at least in disuse already after phase 3a. However, some parts of that space were still occupied.

Besides oven 20026 (*infra*), there is a poorly built wall 24006 which was built on top of sandy deposit 24003 in the southeast corner of the excavated area. Wall 24006 may perhaps be called an enclosure rather than a wall due to its insignificant dimensions and generally inferior appearance. It is 1.56 m long, c. 0.25-40 m wide, with a maximum height of only 0.20 m in one course of stones. There are eight irregular stones in this wall, five of which are larger, flatter boulders. This enclosure runs generally northwest-southeast and it seems to be the western continuation of the line represented by wall 24002 but these two walls are separated by wall 24005 (running northeast-southwest) and wall 24006 does not reach wall 24005 – there is a gap of c. 0.40 m between these (fig. 30).

Oven 20026

This installation is located in the corner between walls 20025 and 24002 (fig 31, 37) and it occupies a space c. 1.26 m wide (north-south) and c. 1.70 m long (east-west). Possibly it extended all the way eastward, to wall 23011/24005. It is significant that the southern and western parts of the installation closely follow the lines of walls 20025 and 24002 even if they somewhat protrude above the preserved height of these walls (fig. 32). This clearly implies that the oven installation was built when the walls were still standing higher than now.

The main chamber of the oven (fig. 33) was partially dug into the sterile sand 24019 (= 23019). It is possible that the oven has two discrete phases of occupation during which the access to the main (combustion) chamber might have been modified. At any rate, the entire installation consists of several parts (fig. 34). Eleven stones (at c. 777.80 m) form the western, southern and eastern limits of the main chamber and on the northern side there are hard-fired (spontaneously) bricks (at c. 777.76 m) of brown-orange color. The bricks also form the central division of the main chamber into the western and eastern parts and probably the superstructure (partial roof?) of the chamber, which, at a certain point of time, collapsed inside.

The main chamber, oval in shape (c. 0.60 m north-south and c. 1.00 m east-west) is c. 0.70 m deep (bottom at 777.00 m). In the center, the oval shape of the chamber is flattened by the brick-made protrusions which served to create a more reduced space for covering. The contents of the chamber is as follows: c. 80 % of pure ash and c. 20 % of brownish grey soil mixed with orange-brown sand (from disintegrated bricks). Large quantities of charcoal, some pottery and burnt organic material have been recovered from the interior. Very many bones, ranging from very small to large (mammals) ones were also found inside.

On the top of *locus* 24019 (see fig. 3) and around the main chamber is a heterogeneous layer 24018 (= lower part of 23014 and top of 23019). It consists of ashy soil to the east of the main chamber and slightly clayish soil to the southeast of it. On top of 24018 there are several fragments of burnt bricks and pieces of charcoal. It is probable that 24018 (top at 777.50 m)

represents the initial use the oven, and contains the burnt material deposited during the periodical cleaning of the interior of the chamber. On top of this layer is feature 24016 (= upper part of 23014 and *locus* 23004) which may represent the second (later) period of use of the entire installation (fig. 35). It consists of burned bricks which form a pattern around the chamber, difficult to understand. Two larger bricks (at *c.* 777.75 m) stand parallel to each other as if forming an “entrance” to the eastern side of the chamber (fig. 36), but no real entrance or hole can be found in the body of the chamber. These bricks stand on the thin layer of the pure ash. In addition, *locus* 24016 includes strange semicircular spaces made of clay located close to the body of the main chamber on the northeastern side. Sandy and ashy soil covers the entire area of the oven up to its preserved top.

Some lumps of vitrified (?) clay were found in or around the chamber, originally thought to be ceramic wasters, which influenced the initial interpretation of the installation as a pottery kiln. However, this hypothesis can no longer be supported. Large quantities of bones and organic material sufficiently demonstrated that it was apparently a cooking oven.

Dating

Locus 20007 yielded ceramics generally recognized as “Nabataean” while the ceramics associated with oven 200026 were dated to the 1st century AD. It is then reasonable to assume that the combined span of phases 3a and 3b should be considered as the early 1st century AD – later/end of the 1st century AD, or even slightly later, i.e., into the 2nd century. Specifically, phase 3b would cover most of this time-span.

Phase 4. Disuse and Abandonment

The occupation in the area of trenches A and E might have ended not long after phase 3b and it was presumably related to the occurrence of some natural phenomena. Of interest here is the western and southwestern parts of mudbrick wall 20008 located in the western part of trench A. It appears that this area had been subjected to some kind of flooding (?). The entire western edge of the wall, as preserved up to one or two courses high, seems to have been totally disintegrated and washed down. The result is a great homogeneous mass of clay – *locus* 20029 – which currently obscures the original connection between walls 20008 and 20023. *Locus* 20029 is largely deprived of finds and its configuration – sharp dip southwestward – suggests that the western edge and the central part of wall 20008 was washed down and away into the alluvial plan southward. Due to the lack of any datable material, this damage might also have happened anytime earlier but the sequence of events in this area of trench 20000 is impossible to reconstruct.

Locus 20029 was, in turn, covered by *locus* 20020 – much more sandy deposit, probably largely wind-borne, but with some pottery datable to the 1st-2nd centuries AD. The pottery may, perhaps, represent some kind of refuse thrown in there from the area of the still occupied northwest-southeast passage. If indeed the passage was still in use, it was not for too long. *Locus* 20004 – a silty-clayish deposit with some lumps of hard clay – appears to have covered the entire area

of trench A, with the exception of tops of walls 20002 and 20003. This layer contained large quantities of pottery the date of which ranged from the 1st through the 4th centuries AD. As neither the Roman nor Early Byzantine periods are occupationally attested in trench A, one needs to assume that the material must have been gradually re-deposited – washed down during rains – from the area of trench C located further north. Such phenomenon is not entirely unlike considering the fact that the entire excavation area gently slopes southwestward. At any rate, any sign of human activity and the occupation in trench A ceased by then.

The situation is somewhat different in the southern part of the excavated area (trench E) but equally implies disuse and abandonment occurring even earlier than in trench A. Perhaps the flooding less affected the space of trench E because, due to the topography, it would run more in southwest direction. *Locus* 24001 which covered wall 24006 and all other soil *loci* in this area was a heterogeneous layer of silt mixed with sand and patches of ash. The recovered pottery included a bewildering combination of Iron Age sherds, late Hellenistic, some 1st century AD ceramics and no later material. This *locus* might also be at least partially related to 20020 although missing the former's late dated pottery, probably due to the fact that this area is further away from the northwest-southeast passage.

Dating

Evidently, the total abandonment of the southern part of the excavated area, i.e., trench E must have happened already in the 1st century AD. The disuse of the northern space, i.e., covered by trench A would have lasted during the 2nd-4th centuries AD.

Phase 5. Natural deposition until recent times

In turn, the entire area of trench A was covered by layer 20001. This *locus* contains very large quantities of disintegrated mudbricks often forming larger lumps or even “ridges” and protrusions. These are often interspersed with smaller pockets of pure wind-blown sand and completely disintegrated sandstones. All this should indicate that during this long-lasting phase, the superstructures of the walls in the entire excavation area must have decayed and collapsed. Again, the same natural phenomena, such as wind-induced erosion and small-scale flooding, as in phase 4, must be responsible for these deposits.

The topsoil, *locus* 20000, generally identifiable with *locus* 24000 in the south, is largely sandy but it also contains large quantities of fine-grain gravel, indicating the continuous washing-down activities of winter rains.

Dating

Basically, from c. 2nd century AD until the present times.

NB. 1 coin in *locus* 20001.

Conclusions

While the overall assessment of the human occupation in the area of trenches A and E will need to await the comparisons with the other excavated areas at Madâ'in Sâlih, certain concluding observations are in order here. There is little doubt that some meaningful relationships exist between some features in trench A and B, D and E on one side and these in trench C. On the other hand, it is equally clear that the nature of occupation in trenches A, D and E is significantly different than that in C and, to some extent, in B. The northwest-southeast passage forms a sort of a separation zone between these occupations.

This passage indeed demarcates the area of the excavations into the northern zone seemingly characterized by the wealth of material culture and the longevity of occupation and the southern zone which after a relatively brief period of considerable building activity reverts to a marginal area, possibly a wasteland, yet still within the largely recognized limits of the settlement in Madâ'in Sâlih.

It would seem that the Early Nabataean period (1st century BC) witnessed a virtual “explosion” in terms of rapidly evolving, predominantly mudbrick architecture. The appearance of mudbrick buildings is sudden, without traces of any previous occupation. However, these buildings did not last for long, probably no longer than *c.* 50 years. Already by the early 1st century AD, the center of activities and occupation shifted further north to the northernmost part of trenches A and D and mainly into the area occupied by trench C. This creates an intriguing question whether or not one should expect more of the 1st century BC mudbrick-type occupation in the central and southern parts of the settlement in Madâ'in Sâlih. At least the earlier excavations would indicate that. However, in the 1st century AD, the town might have rapidly expanded northward (in Area 1) while some areas in the south were already abandoned. Naturally, as the excavations at Madâ'in Sâlih Salih cover, at this point of time, only a very small part of the settlement, and this is still a pure speculation.

Following the abandonment of the mudbrick walls, the evidence from trenches A, D and E indicates a dramatic limitation of occupation there. Furthermore, even the passage formed by the two parallel walls must have already been in disuse by the 2nd century. This remains in a striking contrast with the occupation as attested in trenches C and B which, at least stratigraphically, feature the occupation characterized by rooms surrounded by walls, stone pavements, large quantities of intact ceramics still *in situ*, at least some of these dated to not only the Nabataean but also to the Roman-Byzantine periods.

The results of the 2009 excavations in this part of the settlement clearly indicate high potential of this area for the future explorations. To fully understand the extent of the mudbrick structures, it will be advisable to extend the excavations south and eastwards. However, it is debatable if further expansion in this area is really necessary?

Fig. 1. General plan of Area 2 after the 2009 season (see A3 at the end of the report)

Fig. 2. Trench E, southern section (see A3 at the end of the report)

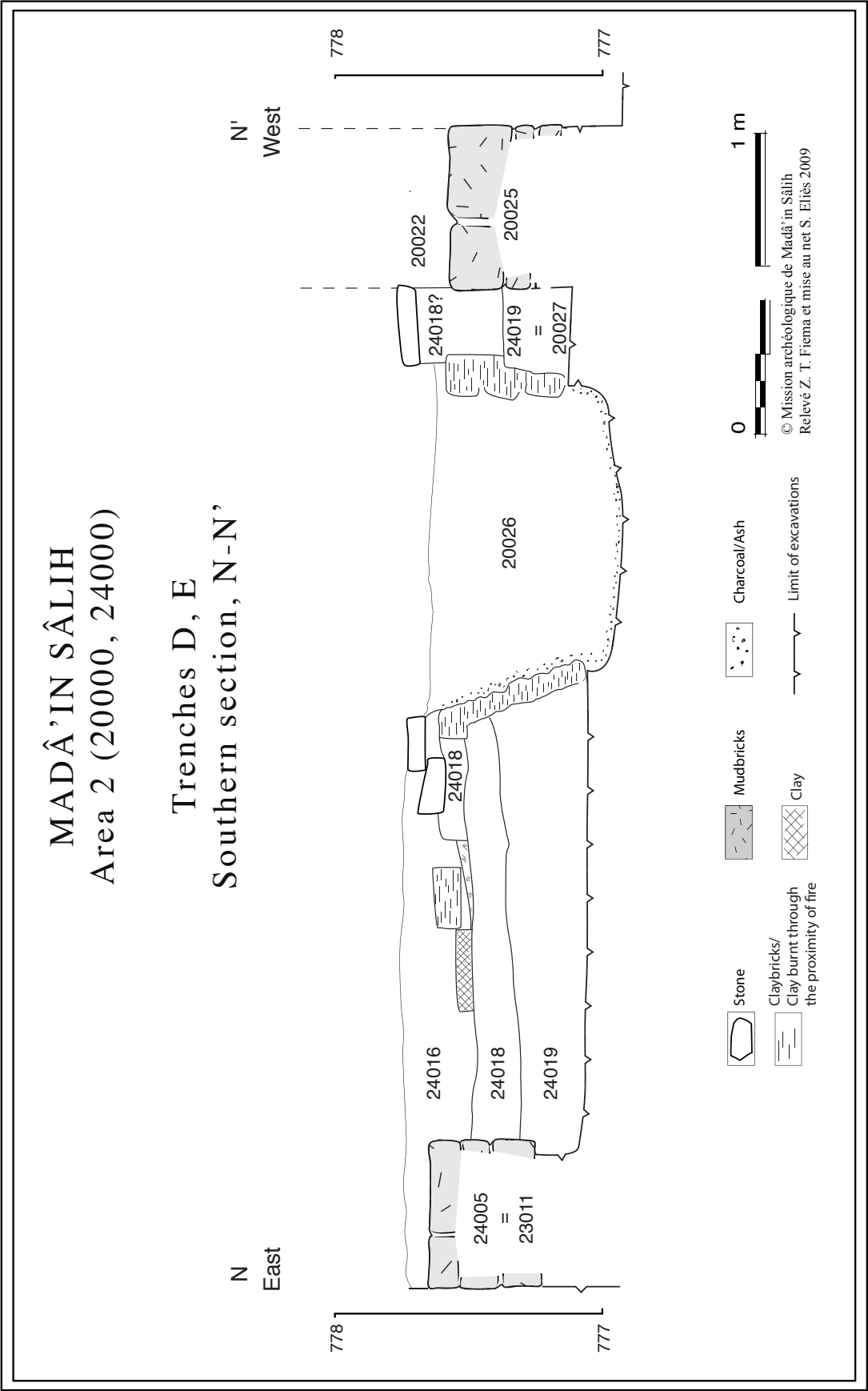


Fig. 3. Trenches D and E, east-west section through the installation 20026



Fig. 4. General view of trenches A, E, and D. View from the east



Fig. 5. General view of structures in trenches A, E and D. View from the south



Fig. 6. Mudbrick walls in trenches D and E. View from the west



Fig. 7. Feature 24010. View from the north



Fig. 8. Wall 20013 (above) and wall 20035 (below). View from the east



Fig. 9. Mudbrick structures in trench D: walls 23010 (foreground), 23011 (background), 23003 (right). Walls 23013/20031 and 23016 are in the center. View from the east



Fig. 10. Mudbrick walls in trenches D and E. View from the northeast



Fig. 11. Mudbrick walls in trenches D and E. View from the southwest



Fig. 12. General view of wall 20002 and channel 20014. Wall 22006 in the background. View from the southeast



Fig. 13. Wall 20002W – foundation courses and the superstructure. Channel 20014 to the right. View from the south

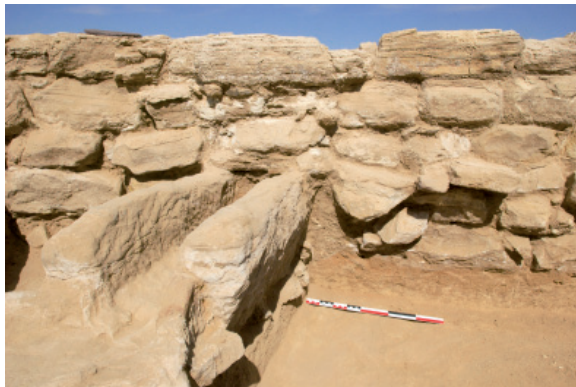


Fig. 14. Channel 20014 and its foundation trench (left) and the foundation courses of wall 20002, eastern part (right). View from the south



Fig. 15. Wall 20002 (foreground), wall 20013 (background) and channel 20014 (left). View from the north



Fig. 16. Wall 20008 (center) and wall 20013 (background). View from the east



Fig. 17. Gap between wall 20008 (left) and walls 20013 and 20035 (right). View from the northwest



Fig. 18. Wall 23010 (left) and walls 23011/24005 (right). View from the north



Fig. 19. Walls 20037 (front) and 20018 (back). View from the north



Fig. 20. Walls 23003/20037 (right), 23012/20018 (center). View from the east



Fig. 21. Substructure 20036 (center), installation 20005 (above). The scale stick is set against the remains of wall 20008. View from the north



Fig. 22. The continuous line of walls 23003 (left) and 200037 (right). View from the north



Fig. 23. Wall 24008 (right), wall 24011 (foreground), surface 24012 (left). View from the south



Fig. 24. Wall 24008 (left) and wall 24011 (center). View from the north

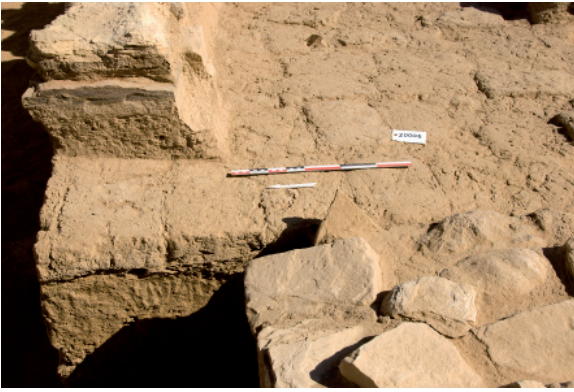


Fig. 25. Wall 20008 (center and left), walls 20003 (upper left) and 20013 (bottom right). View from the west



Fig. 26. Wall 20002, eastern part. View from the south



Fig. 27. The western part of the northwest-southeast passage. Wall 20002 in the background. View from the south



Fig. 28. Channel bedding 20014W (center), wall 20013 (left), wall 20002 (right), channel 20014 (foreground). View from the east



Fig. 29. The northwest-southeast passage. View from the west



Fig. 30. Walls 24006 (center) and 24005 (left). View from the south



Fig. 31. Location and context of oven 20026. View from the east



Fig. 32. Oven 20026 in the context of walls 20025 (left) and 24002 (foreground). View from the south



Fig. 33. Oven 20026 after the excavations. Top view from the north



Fig. 34. Oven 200265. Top view

Fig. 35. Oven 20026. Installation 24015 in front of it.
View from the north



Fig. 36. Oven 20026 before the removal of the contents of the chamber. Installation 24016 to the left. View from the north

Fig. 37. Oven 20026 (center), installation 24016 (left),
installation 24010 (background).
View from the north



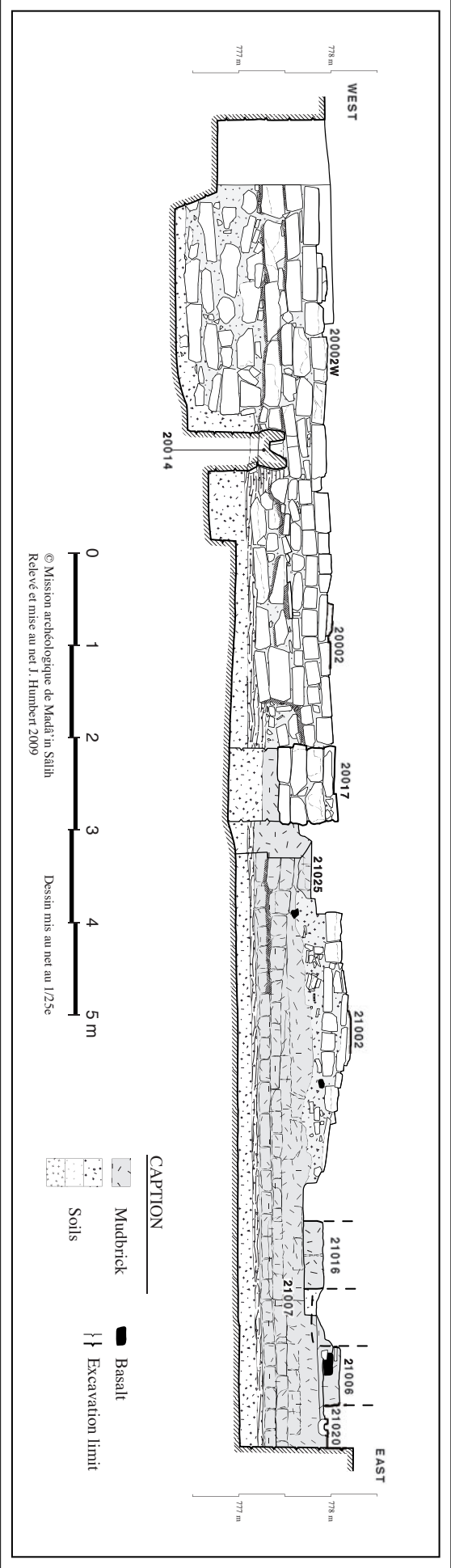


Fig 38. The southern elevation of the walls facing the northwest-southeast passage in trenches A and B on the northern side. From left to right: walls 20002W, 20002, pier 20017, walls 21025, 21002, 21007

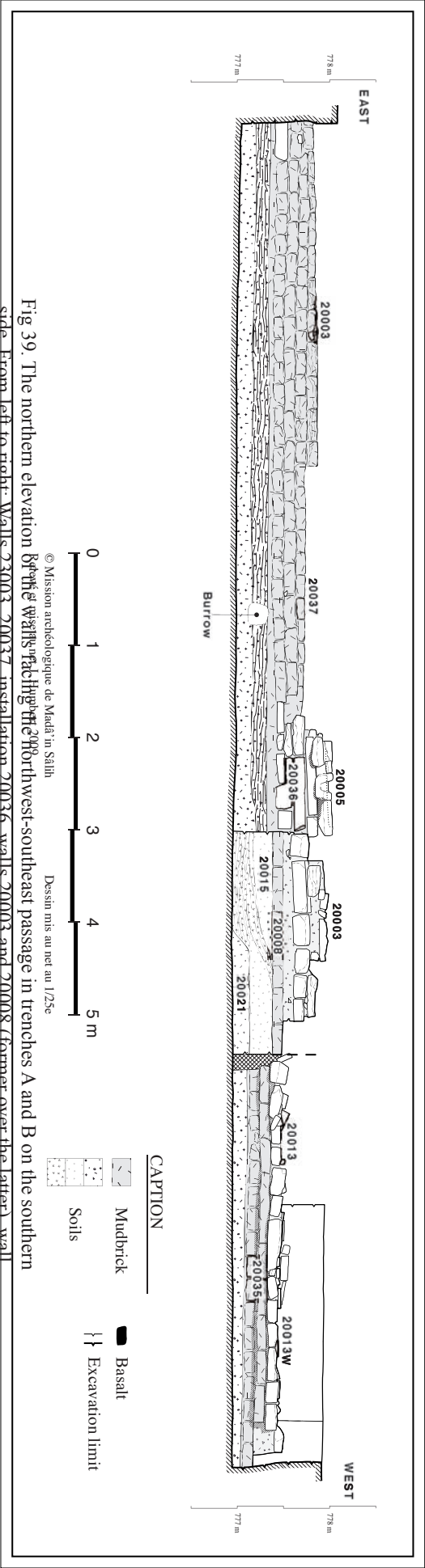


Fig 39. The northern elevation of the walls facing the northwest-southeast passage in trenches A and B on the southern side. From left to right: Walls 20003, 20037, installation 20036, walls 20003 and 20008 (former over the latter), wall 20013 and walls 20013W and 20035 (former over the latter)

Area 2 (22000 and 25000)

Residential Area, Area 2, Trenches C (22000) and F (25000)

Jérôme Rohmer

In 2009, my contribution to the excavations of Area 2 included:

- the continuation of excavations in trench C (22000);
- the opening of a new trench, F (25000).

In trench C, the work fieldwork was limited to small tests and checks and the trench was not extended. The new *loci* created in this trench in the 2009 season were given numbers from 22100 onwards.

Trench 25000 was opened on January 28th in the northeast angle of Area 2, east of trench C (22000) and north of trench B (21000) (fig. 1). It aimed mostly at understanding the full extension of the structures which were partially uncovered in 2008 in these two trenches (the paved room in 22000 and the rooms north of the “passage” in trench B) as well as their mutual relationships. The trench was 5 m north-south and 6 m east-west. It was opened immediately east of 22000 (without baulk). In the south, a 1 m wide baulk was left between trenches F (25000) and B (21000). The *loci* of trench F were given numbers 25000 to 25099. The surface was sloping frankly from the northeast to the southwest (figs 2-3). It was largely featureless, except for some scattered sherds and a protruding stone in the centre of the square, which turned up to be part of a late feature (25001; see below phases 4 and 5).

The results of the excavations in both trenches are presented simultaneously here. Five main architectural phases can be identified.

Phase 1: early mudbrick structures (2nd half of 1st c. BC)

Summary of 2008 results

The most ancient remains in the sector were found in trench C (22000) (fig. 4). They consist of levelled mudbrick features built at a low altitude, without stone foundations and destroyed by later constructions. Most of them were already identified during the 2008 season:

- wall **22015** (top 776.85 m; bottom 777.50 m);

- wall **22063** (777.16 m; 777.50 m);
- wall **20064** (777.12 m; 777.56 m);
- mudbrick feature **22024** (777.23 m; 777.46 m).

For a complete description of these features, see the report on the 2008 season (p. 113-114).

New data in trench 22000

In 2009, an additional mudbrick feature was uncovered in trench 22000, along the foundation course of wall 22006: wall **22100**. It is an early mudbrick wall running approximately parallel to 22006. Its eastern row was destroyed by the foundation trench of 22006. It is built at a low altitude (base 776.88 m), without stone foundation, and is preserved on three courses, up to the level of the top of the foundation of 22006 (777.29 m; fig. 5). In its extant state, wall 22100 stops 1.35 m before wall 22015 and it is probable that its northern segment was destroyed by the foundation of wall 22006, which widens precisely there. Most probably, wall 22100 originally continued north and abutted wall 22015, since both walls are perpendicular and built approximately at the same level. To the south, no trace of 22100 has been found in trench A (20000), south of wall 20002 (i.e. in the northwest-southeast passage).

A small sounding, C6, was opened in the central room of the building, through the upper mudbrick pavement, in order to understand feature **22024** (see figs 1 and 6). The eastern limit of 22024 was found right on the western side of the sounding. It does not seem to have been cut. On the north, it seems to abut the foundation of wall 22019 (and not to have been cut by it). It is therefore a 1,45 x 0,70 m rectangular feature made of three rows of square mudbricks, and preserved on two courses. Its nature and function remain unknown.

Layout of the structures of phase 1 in trench C (22000)

In trench 22000, the structures of phase 1 form a relatively consistent, though incomplete, layout. Walls 22015 and 22100 form a right angle and delimit two spaces or two rooms (?) one on each side of 22100. In the south, since 22100 has not been found continuing south of 20002, it seems that there was already a limit corresponding more or less with the course of 20002. Whether this initial limit corresponded to the lower part of 20002 (under the sticking stones) or to a predecessor of it cannot be decided so far.¹ In the east, the limit of this space probably lay under wall 22061, since no other limit has been found further east in trench B (21000). Besides, wall 22061 was built on at least one earlier mudbrick wall following the same course (wall 25025, see phase 3): it thus appears to be a somehow perennial limit, which might have existed as early as phase 1.

Within the space defined by 22015, 22100 and the predecessors of 20002 and 22061, walls 22063 and 22064 form a small room in the southeast corner. This room was square and measured approximately 2 x 2 m.

¹ Wall 20002 presents a clear horizontal division at the level of a line of protruding flat stones (see fig. 9 and Z. T. Fiema's report). The lower part is built in irregular unhewn stones, while the upper part is made of more regular hewn blocks. In the extant state of the wall, this line of stones seems to divide the foundations of the wall from its elevation. However, it may also correspond, chronologically, to two phases in the construction of the wall.

Absence of floors

No floor associated with the walls of phase 1 was found. In order to account for this absence of floors, one may assume that the space delimited by walls 22015 and 22100 was an open air area. Only the small square structure delimited by walls 22063 and 22064 may be a true room. However, this area has not been excavated under the level of the top of wall 22063 (777.50 m); further excavations will be needed there in order to check the presence of a floor.

Dating

In trench C (22000), there are no dated *loci* belonging to phase 1. No layers of occupation or foundation trenches have been found. The only clue to the date of phase 1 is the *terminus ante quem* provided by the beginning of phase 2, i.e. the late 1st c. BC – early 1st c. AD. Since no earlier pottery has been found in the whole sector, there is no reason to date phase 1 to a much earlier period. Phase 1 is therefore considered to have taken place in the second half of the 1st c. BC.

Connection with trenches B (21000) and F (25000)

The connection of the structures of phase 1 in 22000 with those found in other trenches is problematic. The walls of phase 1 do not bear any clear architectural or stratigraphical relationship with the features in trench B (21000) and F (25000), and the pottery data are too vague to allow any certain harmonization for the early phases.

In the eastern part of the sector, it is uncertain whether wall 21025 (in trench B) already existed in phase 1. It could be the eastern continuation of the above mentioned southern limit (inferior part or predecessor of 20002). It is made of mudbricks directly laid on sand like the other walls of phase 1. Under the original baulk between 21000 and 20000, a south-southwest – north-northeast row of mudbricks, preserved on two courses (777.51 m; 777.26 m) may be the remnant of a wall abutting 21025 or bonded with it (**21100**). The problem with linking these walls to phase 1 is their altitude. At its western end, the base of 21025 lies at 777.20 m, i.e. approximately 35 cm higher than the other outer walls of phase 1 (22015 ad 22100). The irregularity of the terrain may account for such a difference, but, since there is no clear architectural nor stratigraphic connection between trench 21000 and trench 22000, the ascription of 21025 to phase 1 remains hypothetical.

The same is true for the connection with trench 25000. The lowermost structures found in this trench have no clear relationships with any of the structures in 22000. However, they can be related to those in 21000. In sounding F1 (see fig. 6), a west-northwest – east-southeast mudbrick wall was found along the southern baulk of the trench (**25035**; fig. 7). It seems to be made of two rows of stretchers, although its southern row still lies partly under the baulk. It is preserved on one course over its protruding foundation course, and an extra 25 cm elevation, which has been taken out during the excavation, is visible in the southern section (fig. 3). The top of the protruding foundation lies at 777.56 m. Wall 25035 is perpendicular to wall 21016 and, although the connection between them lies under the southern baulk, both walls seem to

belong to the same building. Then, wall 21016 seems to be connected with 21025, since both walls are perpendicular and are built approximately at the same level (21016: 777.33 m; 21025: 777.26 m). Therefore, walls 21025, 21016 and 25035 were most probably in use during the same phase.

A floor abutting wall 25035 slightly over its foundation course has been found in sounding F1 (**25033**; 777.65 m). The pottery found on this floor included a complete globular cooking pot, the base of a storage jar and the rim of a cup made of fine ware (fig. 7). This pottery is provisionally dated to the late 1st c. BC – 1st c. AD. This broad dating may fit either phase 1 or phase 2. Consequently, it is yet impossible to determine whether floor 25033 and the walls associated with it (25035, 21016 and 21025) belong to phase 1 or phase 2.

Phase 2: monumentalization of the area and building of the water channel (1st half of the 1st c. AD)

Phase 2 is marked by two major events (fig. 8): the levelling of the mudbrick walls in trench C (22000) and the construction of monumental stone structures, including a massive north-south wall in trench C (22006) and a water channel (22018).

Walls 22006 and 20002W

The construction of the monumental stone wall **22006** took place in phase 2 (see 2008 report, p. 114-115, for a complete description). 22006 is made of two rows of dressed limestone blocks, with rubble fill. It is preserved on three courses, resting over 1.40 m deep stone foundations. It was probably designed to carry a mudbrick superstructure. It has a 1.15 m wide door located in the northern extension of trench 22000. Wall 22006 was built after the disuse or destruction of walls 22015 and 22100. Indeed, these two walls are levelled to the altitude of the base of 22006, and the foundations of 22006 cut them (see figs 5 and 9).

In 2008, our assumption was that this wall formed the western façade of a building, and that it was bonding in the south with the eastward-bound stone wall 20002. The area to the west of 22006 was thought to be outside the structure. In 2009, the excavations in the western extension of trench A (20000) made it clear that wall 20002 continues westward beyond its junction with 22006. Moreover, there is a clear vertical division in the structure of the wall at the level of its junction with 22006 (see the elevation of the southern face of 20002 in Z. T. Fiema's report). The western part (= **20002W**) rests on much deeper foundations, the bottom of which could not be reached for security reasons. They are at least 1.20 m deep (bottom of sounding 776.30 m), while those of **20002E** are no more than 44 cm deep (bottom 777.12 m). Wall 22006, with its 1.40 m deep foundations, obviously bonds with 20002W and not with 20002E. The latter abuts the angle of the two walls, although some of its blocks have been slightly inserted into 20002E, suggesting that the upper part of the wall (i.e. over the foundations) is continuous (fig. 10).

In 2008, a probable surface was identified to the west of wall 22006, at the level of its base (**22026**; 777.41 to 777.44 m). It ran just over the protruding foundations of the wall, and also over the levelled wall 22015. It rested on a bedding made of a 10 cm thick layer of silty soil

(**22030**). Several sherds and stone objects rested on it (see 2008 report, p. 117-118).

Structures to the east of wall 22006: wall 20002E, water channel 22018/20014, partition walls 22007 and 22019

Considering the elevation of 20002, it seems that, although there is a clear break in the foundations, the “superstructure” of the wall (i.e. its three upper courses) is continuous on both sides of the angle with wall 22006 (see above). It is therefore probable that 20002E was built at the same time as 20002W.²

About 15-20 cm to the east of the outer corner of 22006 and 20002W, wall 20002 encases water channel 22018/20014 (see fig. 10). This channel runs parallel to wall 22006, with a steep slope towards the south. It turns abruptly westwards 1.50 m after running through wall 20002. As it is carefully encased in wall 20002, it has to be earlier or contemporary with it.³

Further north, the channel runs through two mudbrick walls which are parallel to 20002 (**22007** and **22019**) and clearly abut 22006. These walls are built on stone foundations, which encase the channel (figs 11-12). Like wall 20002, they were built at the same time as the water channel. In the southern room, between 22007 and 20002, a potential surface has been identified over the top of the levelled mudbrick wall 22063, at the level of the top of the water channel (**22107**). The trench of the channel and that of wall 22007 were both dug from this level downward, which suggests that this was the floor level at the time of their construction, i.e. in phase 2. However, there were no objects resting on this surface.

Further north, it is uncertain whether other walls existed. Mudbrick wall 22056, which runs parallel to the others and abuts 22006, existed during phase 3, since it closes the paved room in the north. However, its existence as early as phase 2 is hypothetical. It is therefore uncertain whether there was another room north of 22019.

The eastern limit of the area is also uncertain. In the east, wall 20002 abuts a square stone “pier” (20017; see Z. T. Fiema’s report) the function of which remains unknown. The eastern ends of walls 22019 and 22007 are unclear. They certainly abutted a predecessor of wall 22061, but it remains unclear whether this predecessor was wall 25025 (which closes the paved room in phase 3) or wall 21100. This raises the problem of the connection with trench 25000, which will be examined below.

To sum up, it seems that the area located to the east of 22006 was not empty in phase 2. Wall 20002E continued the course of 20002W, and two partition walls delimited at least two square rooms respectively 1.65 (between 20002 and 22007) and 1.20 m (between 22007 and 22019)

² See a contrario Z. T. Fiema’s report, according to whom wall 20002E was added later in phase 3a. However, this divergence does not affect the general phasing, as Z. T. Fiema also considers that the channel was built in phase 2.

³ We abandon our earlier assumption that the channel was built later than walls 20002, 22007 and 22019, and that it was fitted into these walls a posteriori. This assumption led us to posit an intermediary phase, during which these walls would have existed without the channel. Given the stratigraphy in trench A (20000), the evidence is too weak to add this intermediary phase. The trenches identified in walls 20002, 22007 and 22019 may as well result from the construction of the channel contemporaneously with these walls.

wide. The eastern limit of these rooms was probably a predecessor of 22061, either 25025 or 21100. The water channel ran through these walls, parallel to 22006 and at a distance of approximately 50 cm from its eastern face. The door in 22006 allowed the circulation between the eastern and the western area.

Dating

Several *loci* associated with phase 2 have yielded pottery:

- the layers filling the empty space between the water channel and the foundation of wall 22006 (**22045, 22046, 22047, 22055**): 22045 is late 1st c. BC – 1st c. AD; 22046 is “late Hellenistic?”; 22047 is “Nabatean” and 22055 has one “Roman lamp”. This suggests a *terminus post quem* for the construction of the channel in the late 1st c. BC – early 1st c. AD. This dating is consistent with the results of trench 20000, where the *terminus post quem* for the construction of the channel is dated to the 2nd half of the 1st c. BC – very early 1st c. AD (*locus* 20012).

- the surface (**22026**) located at the base of wall 22006, to the west, and its bedding (**22030**): 22030 has yielded a homogeneous material dated to the early 1st c. AD, which may be the *terminus post quem* for phase 2; 22026 contained only one diagnostic rim, provisionally dated to the 2nd half of the 1st c. AD. If the dating is correct, this sherd may correspond to the abandonment of the floor – and therefore to the end of phase 2.

Consequently, phase 2 is probably to be dated between the end of the 1st c. BC and the second half of the 2nd c. AD.

Connection with trenches 21000 and 25000

The connection between the northwest area (trench C, 22000) and the eastern ones (B, 21000 and F, 25000) is as problematic as in phase 1. There are no clear architectural nor stratigraphical relationships between them. The structures and the floor described above in phase 1 (21025, 21016, 25035, 25033) may belong either to phase 1 or to phase 2. It is also possible that these structures were in use during both periods. A more accurate dating of floor 25033 and further excavations in trench 25000 will be needed to solve this pending issue.

Phase 3: Abandonment of the water channel and building of the pavement in 22000; contemporaneous occupation layers in 25000 (2nd half of the 1st c. AD – early 2nd c. AD)

In trench C, 22000, phase 3 is characterized by the abandonment of the water channel and the construction of a stone pavement in the northern room to the east of 22026 (fig. 13). Some kind of partial destruction or disuse may have occurred between phase 2 and phase 3, since the channel was blocked and a 20 cm thick layer of disuse separates, to the west of 22006, the floor of phase 2 from that of phase 3 (**22009a**; see below). Furthermore, at least one wall (22019) was probably levelled.

The paved room (22010) and the abandonment of the channel

The main architectural event which characterizes phase 3 is the installation of a stone pavement in the northern room of the area to the east of 22006. The construction of this feature implied

the abandonment of the channel, which does not seem to run under the pavement and is not connected to it.⁴

The flagstones vary in size from 25 x 35 cm to 95 x 115 cm, with an average thickness of 7-8 cm. They are made in a relatively friable limestone, but they are orthogonal and carefully assembled. For a complete description of the pavement, see the 2008 report, p. 119.

As was ascertained in 2008, the paved room is delimited to the west by wall 22006 and to the north by wall 22056 (a two row header/stretcher mudbrick wall abutting 22006). In the south, it is unclear whether wall 22019 was still standing or whether it had already been replaced by wall **22005**. Wall 22005 is a single row stone wall built over 22019 – and partly over the pavement. It is linked to the pavement with a strong mortar (22065). It is interrupted near the eastern baulk by a door, evidenced by the presence of a threshold (22012).

In 2009, the eastern part of the paved room was uncovered in trench 25000. Wall 22005 was fully uncovered: threshold 22012 is 1.25 m long, and it abuts in the east a perpendicular mudbrick wall, which marks the boundary of the paved room in the east (**25025**). Its western face is linked with the pavement through mud coating or mortar (fig. 14). Only a narrow strip of this wall is visible, since its eastern face lies under the later wall 22061. However, a parallel row of mudbricks was found in trench 25000, on the other side of wall 22061 (**25039**). This row of mudbricks was levelled in phase 4, since the occupation layer 25022/25015/25004 lies over its top. It may therefore correspond to the eastern face of 25025. If this is correct, the total width of the wall would reach 2.20 m, which is very wide but not unprecedented in this sector (see wall 20018 in trenches A, 20000 and E, 24000). The northern end of 25025, near to the eastern bulk, is formed by two hewn blocks laid as stretchers (**25026**), which are linked to the pavement with the same mud coating. These two stones may correspond to a threshold leading to the area in the east.

In the room to the south (between 22005 and 22007), which is accessed by the door in 22005, a floor was identified at the same level as the pavement. It lies over the top of the levelled wall 22019, which is continued in the eastern half of the room with a mudbrick pavement (**22104**; figs 15-16). This pavement is built over the early mudbrick feature 22024 (see phase 1). Immediately beside the channel, on both sides, several rows of stones, approximately aligned with the rows of bricks, seemed to be the continuation of this mudbrick pavement (cf. 2008 report, p. 120). In 2009, a pocket of ash including several sherds was found at the same level, just under the initial eastern limit of trench 22000 (**25027** ; 777.83 m). This confirms that this level was the surface of an occupation layer.

Floor 22104 abuts the base of wall 22007 (i.e. the top of its stone foundations) to the south. The perfect coincidence between the floor of phase 3 and the base of 22007 is unexpected because this wall was most probably built during phase 2 (see above). Several hypotheses might explain

⁴ In 2008, the issue of the relationship of the pavement with the channel was left pending. According to some additional measurements and checks made this year, it is very unlikely that the channel ran under the pavement.

this:

- the stone foundations of wall 22007 were protruding over the floor by a few centimetres during phase 2;
- the wall was levelled and its foundations were risen by a few centimetres in phase 3;
- the floors of phases 2 and 3 remained at the same level.

There is no strong argument in favour of any of these hypotheses.

In the south, the building was still delimited by wall 20002. In the southern room, a compact surface with a thin layer of flaky floor coating may correspond to the floor (top of *locus* **22022**; 777.68 m), although no artefacts clearly rested on it.

The area to the west of wall 22006

In the area to the west of wall 22006, a layer of occupation probably corresponding with the paved room has been identified at the base of wall 22052 (**22102**). It is a flat surface lying on a layer of soil and some fallen mudbricks. It probably continued south, since a very thin layer of ash can be seen in the eastern section of the trench, at the same level (777.61 m). As it is the second occupation layer (chronologically speaking) associated with 22006, and since the third one (**22002**) necessarily corresponds to a phase when the door in 22006 is blocked up (i.e. phase 4, see below), it is very likely that it corresponds to phase 3.

Unfortunately, no real diagnostics were found among the sherds lying on this surface, which is broadly dated to the 1st c. AD. This dating is however consistent with the time range proposed for phase 3.

Dating

Several *loci* provide us with a broad *terminus post quem* for phase 3. The pottery found in the levels located under the missing flagstone in the pavement (**22013** and **22014**) are dated to the first half of the 1st c. AD (see 2008 report, p. 121). Moreover, as mentioned above (phase 2), the pottery of surface 22026, to the east of wall 22006, provides us with a *terminus ante quem* for phase 2 in the middle – 2nd half of the 1st c. AD.

Concerning the end of phase 3, the broken vessels which were lying on the pavement 22010 are contemporaneous with the abandonment or destruction of the paved room (fig. 17). However, since they all belong to local types, they are not dated precisely so far. Meanwhile, the only evidence we have for the closing date of phase 3 is the *terminus post quem* provided by the upper occupation layers (phase 4), which are dated to the “late Roman” period (end of 2nd – early 4th c. AD). Given that phase 3 was followed by an episode of destruction or abandonment, and since no diagnostic sherds nor coins from the 2nd c. AD were identified in the trench, it seems reasonable to assume that it had ended by the mid-2nd c. AD.⁵

⁵ The absence of 2nd c. pottery diagnostics may be due to our poor knowledge of the local pottery. The absence of 2nd c. coins in the layers of phase 3 (to be confirmed) is more striking. Notably, no Arabia adquisita types were found in these layers.

Therefore, phase 3 can be dated to a time range covering the 2nd half of the 1st c. AD and the early 2nd c. AD.

Trench 25000

Occupation layers contemporary with the paved room were found only in the southern part of trench F, 25000. Stratigraphically speaking, all the occupation layers abutting wall 22061 can be ruled out, since this wall was built in phase 4 (after the levelling of the eastern wall of the paved room, 25025).

In sounding F1, just under surface 25022, the brown compact silty soil continued, with pottery, bones and pockets of ashes, down to the altitude of 777.88 m (**25029**). Unfortunately, the succession of the occupation layers was very difficult to understand in this area, especially since no section was available at the end of the excavations (wall 25042 happened to run exactly under the baulk). Moreover, no clear surface was found. Therefore, it remains uncertain whether *locus* 25029 is an occupation layer associated with phase 3, especially since the pottery from this layer could not be dated precisely. If it was indeed an occupation layer, it abutted wall 25035 in the south.

In the southeastern corner of the trench, the picture is clearer. Immediately under the “late Roman” levels (which we associate with phase 4), a 12 to 15 cm thick occupation layer was found (**25021**). It is made of grey silty soil with small inclusions, and includes pockets of ash as well as sherds and animal bones. It rests on a relatively clear surface (surface **25036**; 777.92 m, fig. 18). This surface is formed, in the north, by the top of a levelled east-west mudbrick wall belonging to an earlier phase (25037). It was marked by the presence of a horizontally laid flat stone and some sherds. The pottery of this layer contained probable imports from Petra, which allowed to date it with a relative certainty to between the 2nd quarter of the 1st c. AD and the 1st quarter of the 2nd c. AD (Schmid 3).

In the north, this occupation layer abuts wall 25009. In the west, it abuts a strange feature, consisting of a row of small irregular stones which might have delimited a north-south mudbrick wall (**25024**; altitude of top 778.10 m). This feature is close to feature 21024, on the other side of the southern baulk. However, the top of this latter feature is approximately 30 cm below (777.82 m). These two features will have to be explained during the next season.

Further excavations will also be needed to identify phase 3 in the northern part of trench 25000 (i.e. north of wall 25009).

Phase 4: abandonment/destruction of the paved room and reconstruction of the area (end of the 2nd – early 4th c. AD)

Phase 3 was followed by a significant episode of abandonment or destruction, as shown by the broken pots lying over the pavement (fig. 17). The pavement was covered with a 20 to

30 cm thick layer of disuse, made of a relatively compact silty soil with occasional spots of ash (**25023**; fig. 2). In phase 4, new structures were built (fig. 19). They basically take up the layout defined during phases 2 and 3, although the walls are not exactly built one above the other.

Occupation over the paved room

About 20 cm above the pavement laid a horizontal layer of ash with several stone and pottery artefacts (**25017**; fig. 20). However, this layer is probably not a layer of occupation, since it is lower than the top of the pots which lay on the pavement (bottom of 25017: 777.88 m; top of 22010_P1: 778.11 m). Moreover, a vertical flat stone goes right through it. It is therefore more cautious to consider it as a part of the layer of disuse covering the pavement. The ash and the artefacts probably result from the collapse of the roof.

In fact, the layer of reoccupation above the paved area lies about 35 cm above the flagstones (**25011**; fig. 21). It consists of a thin layer of soft dark soil, with many small white inclusions (remains of a floor coating?) and occasional pockets of ash. In trench 25000, it included a fragment of a stone basin, as well as several small stones and a metallic objet.

Immediately over this layer lay a hard surface which may correspond to a subsequent – but not much later – occupation (**25010**; fig. 22). Several artefacts were resting on it: a stone object, a piece of glass, a coin and various sherds.

Both these layers partly lie over the levelled (or melted) wall 25025. In the east, they abut a wall made of a double row of irregular stones, built over the remains of wall 25025 (**22061**). It is preserved on one course but it probably had a mudbrick superstructure, which was destroyed later (destruction? erosion?).

In the west, these layers probably abutted a mudbrick wall built over wall 22006 (**22035**). Although it follows the course of 22006, this wall is probably not its original superstructure, since it blocks its main door (fig. 23). Although it is preserved only from the door northward, it probably continued southward over the course of 22006. During the excavations, wall 22006 was indeed covered with a thin layer of very compact clay, which may well correspond to the melted remains of wall 22035.

The area to the west of wall 22006

West of wall 22006, the uppermost layer of occupation found corresponds probably with phase 4, since it abuts the blocked up door in 22006. It consisted, in the middle of the square, of a 10 cm thick ash layer (**22002**), and continued further north as a layer of loose earth with many sherds and artefacts (**22051**; see 2008 report, p. 123). In the north, this layer lies at the base of a poorly preserved mudbrick wall, which abuts wall 22035 and runs perpendicular to it (**22052**; see 2008 report). It is built over a stone foundation and its base lies at the same level as wall 22035. Although it is badly preserved, it seems to be made of one row of headers and one row of stretchers. One course is preserved and it can be followed westward for one meter only.

Trench 25000 north

The stratigraphical connection between the paved room area and the eastern area in trench F, 25000 is provided by wall 22061. The layers of occupation abutting the base of this wall can undoubtedly be ascribed to phase 4 (see fig. 24 for the earliest levels of occupation/abandonment associated with this phase).

In the northern part of the trench, two or three successive occupation layers were identified from the base of wall 22061 upward (**25012**, **25008/25005b**, **25006**; see fig. 2).

Layer **25012** (778.10-778.24 m) lay at the base of wall 22061. It consisted of a loose grey powdery soil with numerous white inclusions (remains of floor coating?). It included large pockets of ash and yielded a large amount of material (sherds and bones). It rested on a more compact silty layer, which may be a floor bedding (**25034**). Several objects were found resting on the top of 25034, among which a circular quern-stone made of basalt (25008_S1) as well as sherds (a broken base of pithos), bones and stones (fig. 24).

Immediately over 25012 lay surface **25008**, which still abutted wall 22061 in the west. This surface was characterized by a thin layer of yellow hard-packed sandy soil forming a floor bedding (fig. 25). The floor bedding was only partly preserved. Several *in situ* objects rested on it, among which a conic sandstone quern (25008_S1) and two flat stones probably used as bases for other objects.⁶ A broken pithos was also resting on it (25008_P1). In the northern section, the thin horizontal layer of soft soil **25005b** may be a trace of the occupation associated with this surface.

Further up, several big pockets of loose and powdery soil were identified in the northern section (**25044**). Though discontinuous, these pockets are approximately horizontal and lie at roughly the same level (778.26/778.45 m). They may correspond to the remains of a late occupation. However, we prefer not to ascribe this occupation to phase 4. Indeed, as shown by the northern section (fig. 2), layer 25044 does not seem to abut wall 22061 in the west, but a stone feature built over this wall (**25045**; late wall? door-blocking?).

In the south, layers 25012, 25008 and 25005 abut a 1.10 m wide mudbrick wall made of alternating rows of headers and stretchers (**25009**). Originally, this wall had probably a door at its western end. Indeed, a 1.20 m long segment of wall made of two rows of irregular sandstone blocks was built over this wall, at its intersection with wall 22061 (**25001**; fig. 26). This feature is superimposed to wall 25009 and is delimited in the west and in the east by two vertical flat stones. This suggests that it filled a gap in the wall. It may therefore have been a door-blocking. The blocking is not as wide as the wall (0.70 versus 1.10 m). This difference created two narrow recesses in the wall, which may have been used as niches or cupboards.

⁶ Although the basalt quern-stone from 25012 and the sandstone quern-stone from 25008 lay very close to each other, they were probably not part of the same tool. It is indeed difficult to imagine a grinding tool combining these two materials: the sandstone is too friable and would crumble away during the grinding process. This confirms the fact that 25008 and 25012 are two different layers of occupation.

It is uncertain whether feature 25001 has to be ascribed to phase 4 or 5. A broken jar was found along its base, in the northern recess (25020_P1; 778.31 m). In terms of altitudes, this pottery object may belong either to the occupation layer lying over surface 25008 or to the latest occupation observed in the section (25044). Unfortunately, this was impossible to check during the excavations due to the poor state of preservation of these layers in the western part of the area. Note that the provisional dating of the jar (between the 1st c. AD and “Late Roman”?) is compatible with that of phase 4 (see below).

In the north and in the east, layers 25012, 25008 and 25005 continue under the baulks. It is therefore impossible to determine the limits of this area in phase 4. It also remains uncertain whether this area was roofed or not. Given the absence of any significant layer of collapse or melted mudbrick, it might have been an open courtyard. However, further excavations will be needed to ascertain this.

Trench 25000: the southwestern room

Traces of significant human occupation were also found in the southern part of the trench, in the room delimited by wall 25009 in the north and wall 25028 in the east. Scattered stone and pottery objects were found in a 40 cm thick layer immediately below the surface. As a precaution, this thick layer was subdivided into several arbitrary *loci* (25004; 25015; 25022). The two lowermost *loci*, 25015 and 25022, may form a single layer of abandonment (figs 24 and 26). Several complete vessels, coins and metal objects were found in them. The uppermost *locus*, 25004, was very thick (about 30 to 40 cm) and contained only broken artefacts (fig. 27). It may result from the collapse of the roof.

However, no clear surface or marked difference in the nature of the soil was seen between these layers. It was impossible to check the stratigraphy of the area retrospectively since a wall (25042) happened to run under the southern baulk. Besides, the pottery of all these layers seemed to be chronologically rather homogeneous. It is therefore unclear whether layers 25004-15-22 form a unique layer of destruction/abandonment or if they result from several successive phases of occupation.

At any rate, the lowermost of these *loci* corresponds to a relatively hard surface (25022; 778.00 m). It was probably the first floor of phase 4 in this area. This surface included an interesting feature: a pottery pipe was set vertically in the floor (height 20 cm; diameter 15 cm). As shown by the sounding made in the eastern part of the room, this pipe did not lead to anything and stopped 20 cm under surface 25022, in a layer of sandy earth (fig. 28). Its function remains unclear. It might have been used as a basic small-scale waste pipe, or as a hiding place: a flat stone, which was lying next to it, was perhaps used to cover it.

Layers 25004/15/22 are enclosed in an approximately square room. In the west, the room is delimited by wall 22061, since the layers run over the levelled wall 25039. In the north, they abut wall 25009. In the east, surface 25022 abuts the base of the newly built wall 25028. It is a mudbrick wall made of one row of stretchers and one row of headers, and resting over 30 cm

stone foundations. As appears in the southern section (fig. 3), these stone foundations were dug across the remains of the levelled wall 25035. In the south, the room was delimited by an east-west wall which lies for the major part under the southern baulk (**25042**). In the southwestern corner of trench 25000, only one row of stones belonging to this wall appeared. Its eastern end had been found in trench 21000 in 2008 (**21023**). The combination of these two parts shows us that the wall is made of two rows of stones and is approximately 75 cm wide. As appears in the southern section (fig. 3), the remaining course of stones probably corresponds to the foundations of the wall, while the upper courses were probably made of mudbrick.

Trench 25000 : the south-eastern corner

In the southeastern corner, a third room is delimited by walls 25009 and 25028. Only a small surface of this room was exposed in trench 25000. A horizontal layer of brown soil (**25018**) was found immediately over the occupation layer of phase 3. In the west, it is not clear whether it still abuts the mudbrick/stone feature 25024 or whether it abuts wall 25028 (fig. 3). At any rate, it lies at the same level as the layers 25004 /15/22 and is dated to the same period (see below).

This layer is covered by a 6 to 16 cm thick layer made of a brown-grey silty soil, with no sherds, which may be a layer of disuse (**25016**). Immediately over this layer lies another layer of occupation made of a very loose grey soil with white inclusions and occasional pockets of ashes (**25005b**). This layer abuts wall 25009 in the south, and wall 25028 in the west (fig. 3). Therefore, although it is later than 25018, it seems to belong to the same architectural phase. The pottery dating confirms that the time interval between these two layers was short (see below).

Further up lies another layer of occupation, marked by a hearth filled with ash and burnt wood (**25006**). As the previous ones, this layer seems to abut wall 25028 in the west. However, we tend to associate this layer with phase 5 (see below). According to the pottery it yielded, *locus* 25006 may be either “Late-Roman” or Byzantine”.

Connection with trench 21000 and general layout of the structures in phase 4

Unfortunately, the stratigraphic connection between trench 25000 and 21000 is not very clear for phase 4. A probable occupation layer located near the surface was mentioned by M. al-Hajîrî in 2008 (**21001**; see 2008 report). It contained many sherds and several coins. Its top lay at approximately 778.19 m, which broadly corresponds with the uppermost layers of phase 4 in trench 25000 (25005, 25004). Although it could not be dated precisely so far, it may well belong to phase 4.

Layer 21001 lay over the levelled wall 21016, and it probably abutted wall 21002 in the south and wall 21006 in the east. Therefore, one may assume that these walls were built in phase 4.

This allows us to draw a clearer picture of the buildings of phase 4 (fig. 19). It seems that the 3 x 2.30 m rectangular room formed by walls 25009, 25028, 25042 and 22061 was located in the northwest corner of a wider building. This building was enclosed in the south by wall 21002 and in the east by wall 21006. Note that this layout is similar to that hypothesized for phase 1

in trench 22000 (see fig. 4): a small square room in the corner of a wider, rectangular and non-partitioned area (room? courtyard?).

Dating

Most of the layers of occupation mentioned above (25010/11; 25008/12/05; 25004/15/22; 25005/18) have yielded a relatively homogeneous material dated to the “Late Roman” period (end of the 2nd c. – early 4th c. AD).

Only the *loci* located to the west of wall 22006 (22002 and 22051) were not clearly dated. The sherds of 22051 are “certainly not before the late 1st c. AD”. A Trajanic coin of the “*Arabia adquisita*” type was found in 22002. Since these coins may have been in circulation for a long time, their presence is not incompatible with an occupation between the late 2nd and the early 4th c. AD.

Phase 3 can therefore be dated to a time range stretching from the late 2nd to the early 4th c. AD. The episode of disuse or destruction which preceded it must have taken place in the course of the 2nd c. AD.

Phase 5: Abandonment/destruction and small-scale reoccupation of the area (between the 4th and the 6th c. AD?)

The latest architectural phase in area 22000/25000 has not left many traces, and it is difficult to draw a coherent picture of what the latest occupations of the area looked like (fig. 30). What seems certain, however, is that it underwent a period of disuse and was reoccupied on a relatively modest scale at some point of time between the 4th and the 6th c. AD. Most of the evidence for this late phase comes from trench 25000.

The southeastern corner: wall 25002

In the southeastern corner, a line of stones probably forming a small wall was found immediately near the surface (**25002**; fig. 29)⁷. It is a roughly built feature made of a single row of very irregular stones, preserved on one course. It is oriented west-northwest – east-southeast, which is consistent with the orthogonal “grid” defined by the major walls of the earlier phases. However, its course does not correspond to that of any earlier wall, and it is built directly over the layers of occupation of phase 4.

As stated above, the uppermost occupation layer identified in the southeastern corner (**25006**) may be contemporary with this wall (fig. 3). Its stratigraphical connection to the wall is ambiguous, since the layer is slightly lower than the base of the wall (the wall was built at the level of its top). Nevertheless, layer 25006 seemed to be enclosed in the small area lying between the south baulk and wall 25002: in the southern section, it stops at the point of intersection between wall 25002 and the baulk, and we could not trace it on the eastern section. Therefore, it is likely that this occupation layer should be associated with wall 25002. The slight difference of altitude between the wall and the layer may be due to the fact that the latter is a hearth: it may have been

⁷ This wall is above walls 25028, 25024 and 25043. Therefore, it is not visible on the plan of fig. 1.

buried. The dating of the pottery from 25006 is broad (Late Roman/Byzantine) and could fit either phase 4 or phase 5.

The circular hearth (25007)

In the southern part of trench 25000, above the remains of the southwestern room, a circular hearth was found immediately under the surface, along the southern baulk (**25007**; fig. 31). It consisted of a circular pit, about 40 cm wide and 20 cm deep, filled with ash and burnt wood. It also contained a big carpentry nail, which suggests that construction wood was burnt there: most probably, the roof of the phase 4 building was reused as fuel. As shown by the picture, the hearth was obviously set after the end of phase 4. It is dug into *locus* 25004 which is the upper layer of abandonment/destruction belonging to phase 4.

Trench 25000 north

In the northern part of trench 25000, the uppermost layer of occupation is probably to be ascribed to phase 5 (**25044**; see above phase 4). As shown by the section (fig. 2), this layer does not seem to abut wall 22061 in the west, but a stone feature built over this wall (**25045**; late wall? door-blocking?).

The walls in phase 5

25045 may have been part of a small irregular stone wall built over wall 22061 in phase 5. Indeed, several small blocks were scattered over the remains of wall 22061, immediately under the surface. No actual wall was seen during the excavations, but the remains were immediately under the surface and may well have been looted. It is known that in recent times, the inhabitants of the neighbouring villages took a lot of stones from the site in order to build their houses.

The orientation of wall 25002 shows that the newly built walls, although they do not necessarily correspond to earlier ones, took up the “orthogonal” grid inherited from the earlier phases. Besides, at the western end of this wall, a stone protruding towards the north suggests that it formed a right angle just over the earlier wall 25028. Although no further remains of this feature were found, we can imagine that the perpendicular wall was built on the same course as 25028.

Further evidence for this persistence of the original layout into the latest phase was found in trench 22000 during the 2008 campaign. At the beginning of the excavations, immediately under the surface, a clear line of stone had been found in the southern part of the square (**22004**; fig. 30). Later, it turned out to be built over the southern row of mudbricks of the earlier wall 22007 (cf. 2008 report, p. 124).

As far as feature 25001 is concerned, it is unclear whether it is a door-blocking from phase 4 or if it is part of a new stone wall built in phase 5. As stated above, I tend to favour the first hypothesis.

It is therefore very likely that in phase 5, a network of very roughly built stone walls was built over the remains of the earlier walls. Several of these walls seem to have been made of only one

row of irregular stones. It is therefore questionable whether these features were actual walls. Their construction technique does not suggest permanent roofed structures: they look rather like small fences. This suggests a more precarious, perhaps non-permanent occupation, or at least a different use of the area (small courtyards or pens for the animals instead of housing?).

However, our perception of phase 5 is very fragmentary and it may be biased by the intense erosion and looting which the area suffered from: the few precarious structures left may be not necessarily representative. In the northwestern angle of trench 22000, wall 25034 may be an example of a more solid wall, made of two rows of stones, and perhaps corresponding to a roofed structure (cf. 2008 report, p. 134). Further excavations will be needed to determine the nature of this feature, which is not associated with any occupation layer.

Chronology of phase 5

There is evidence for a significant episode of abandonment/destruction between phases 4 and 5. In the southern room of trench 25000, the thick layer 25004, which contained many artefacts, seems to result from a wholesale collapse of the building. In the northern part, the pottery and stone objects found *in situ* on surface 25008 were probably left there after the abandonment of the area. Besides, as mentioned above, it seems that new walls (or fences) are built, which implies that the earlier walls had been at least partly levelled.

The pottery analysis confirms the existence of a chronological gap between phases 4 and 5. Indeed, while the *loci* of phase 3 show no “Byzantine” element, the pottery from the circular hearth 25007 is dated to the “Late Byzantine” period (5th-6th c. AD). This suggests a significant period of abandonment.

Given the scarcity of the pottery data for phase 5, it is impossible to assess the length of this phase – and consequently that of the period of abandonment which preceded it. The pottery from the surface layers contained only a few “Byzantine” elements. Although one has to take a potentially strong erosion process into account, this does not suggest a very long occupation in phase 5.

Conclusion

The occupation of the area stretches from the 2nd half of the 1st c. BC until the 4th to 6th c. AD. Five architectural phases have been identified within this time range.

The earliest urbanization of the area dates back to the 2nd half of the 1st c. BC, with the construction of early mudbrick structures (phase 1). In trench 22000, we can identify a small square room built in the southeastern corner of a wider square area (courtyard?). This phase was short-lived, since its structures were probably levelled by the beginning of the 1st c. AD. However, it defined an orthogonal “grid” the basic orientation of which will be kept until the latest period. This phase corresponds to phase 1 in trenches A and E. Note that these early constructions may well be earlier than what is commonly acknowledged as the date of foundation of the city, i.e. the reign of Aretas IV (9 BC-AD 40).

The area was intentionally levelled and completely rebuilt around the turn of the era, with monumental structures built on sturdy stone foundations (phase 2). The orientation of the structures of phase 1 was kept, but the place of the walls significantly shifted. A massive building appeared in trench 22000. Its western part may not have been roofed and its eastern part was divided into a row of at least three rectangular rooms. A water channel evacuated the water from the northernmost room down to the northwest-southeast passage (“street”) located in the south. This phase covers phases 2 and 3 in trenches A and E. It probably corresponds with Aretas IV’s building campaign.

In the second half of 1st c. AD, the building was significantly reorganized, perhaps after a short episode of disuse (phase 3). Its layout remained basically the same but the water channel was abandoned and a stone pavement was built in the northern room. This phase certainly ended by the mid-2nd c. AD – and probably earlier. It corresponds to a phase of disuse in trenches A and E (phase 4).

A significant episode of destruction or disuse followed phase 3. The building of trench 22000 was abandoned and collapsed. This archaeological evidence may contribute to shed new light on the aftermath of the Roman conquest in 106 AD, and on the apparent interruption of monumental funerary construction from AD 75 onward.

The area was reoccupied from the late 2nd c. – early 3rd c. AD onward (phase 4). New walls were built over the levelled structures of phase 3. In trench 25000 and 21000, we may identify a square room, probably roofed, located in the northwest corner of a wider rectangular space (courtyard?). In the north was probably another courtyard accessed through a door. During this phase, the southern part of area 2 (trenches A and E) seems to be devoid of any human activity (see phases 4 and 5 in Z. T. Fiema’s report), unless the remains have been totally washed out by the erosion or looted by the locals. The structures of phase 4 were probably abandoned at the beginning of the 4th c. AD. The beginning of this long phase of occupation may be contemporary with the epigraphically attested restoration of the city-wall by the Roman army in 176-177 AD. Whether this restoration corresponds with a wider reconstruction and reoccupation of the whole site is a question which deserves to be raised, but which cannot be answered yet. At any rate, this phase of occupation has echoes in the epigraphic record, with the funerary inscription of Raqûsh in AD 267.

The last phase of occupation attested in the area took place between the 4th and the 6th c. AD. It is evidenced mostly by the presence of hearths and small walls. The remaining structures of this phase are very roughly built. They seem to reflect a more precarious, perhaps non-permanent occupation, or a different use of the area than before: the small walls call to mind fences for animal pens or encampments. In the southern part of the area, no remains associated with this time period have been found. However, our perception of phase 5 is very fragmentary, and may be biased by the erosion and the looting which the area has suffered from. Indeed, the excavations in Area 1 have uncovered a whole neighbourhood, made of actual and well-

built houses, and dating back to the same time range as phase 5 (see G. Charloux's report). It is uncertain so far whether the discrepancy between Areas 1 and 2 reflects different modes of occupation or a mere variation of the degree of erosion. Indeed, area 1 is much less exposed to water-induced erosion than area 2, which is crossed by the bed of a wadi.

Looking back on this occupational and architectural sequence, a striking fact is the persistence of a basic organizational layout during a time period of four to six centuries. Indeed, even if the walls are not always built over one another, they always abide by an orthogonal grid defined as early as phase 1. The survival of this grid suggests that no episode of abandonment or disuse was long enough to abolish the urban frame in this area. Therefore, despite several episodes of abandonment, destruction or refurbishment, the global picture of the north part of Area 2 gives the impression of a relatively continuous occupation. Whether this reflects the history of the whole site is still very uncertain: while the excavations in Area 2 have provided evidence for a continuous occupation from the early 1st c. to the 4th to 6th c. AD, those of the southern part of Area 2 suggest a definitive abandonment as early as the 2nd c. AD (see G. Charloux and Z. T. Fiema's report). As mentioned above, this issue is clouded by the erosion factor, the importance of which varies from place to place. Further excavations will be needed to clarify it.

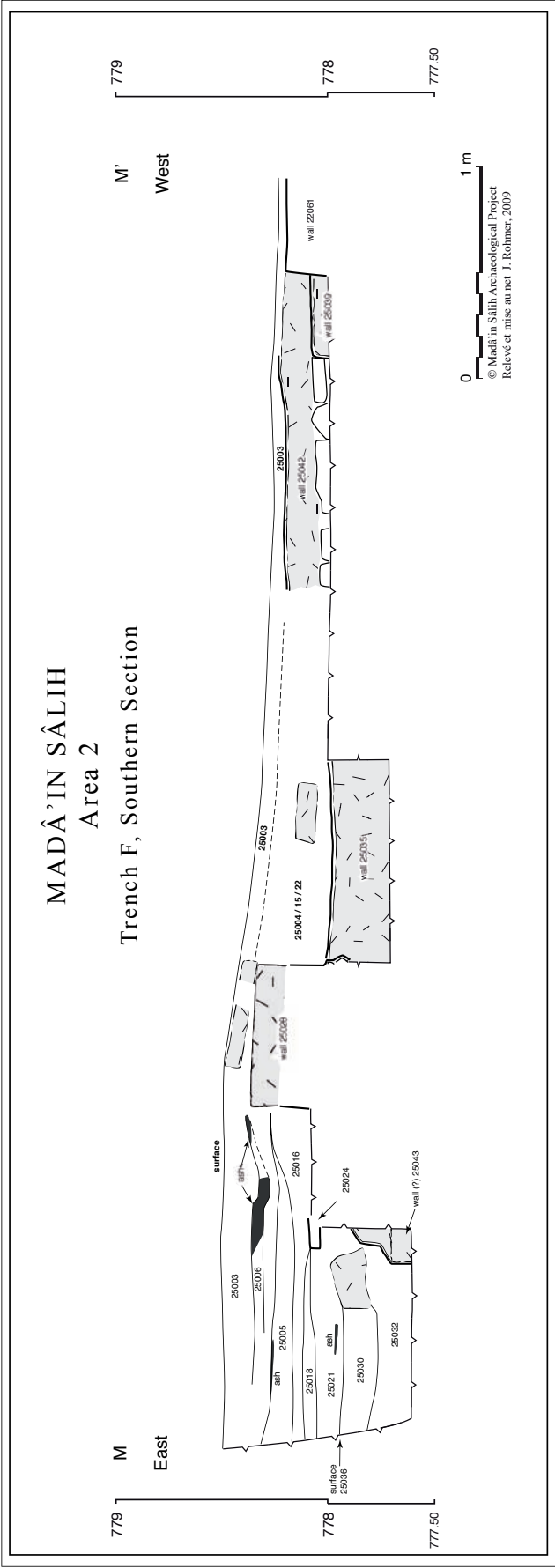


Fig. 3. Trench F (25000), southern section



Fig. 5. Wall 22100, cut by the foundations of wall 22006

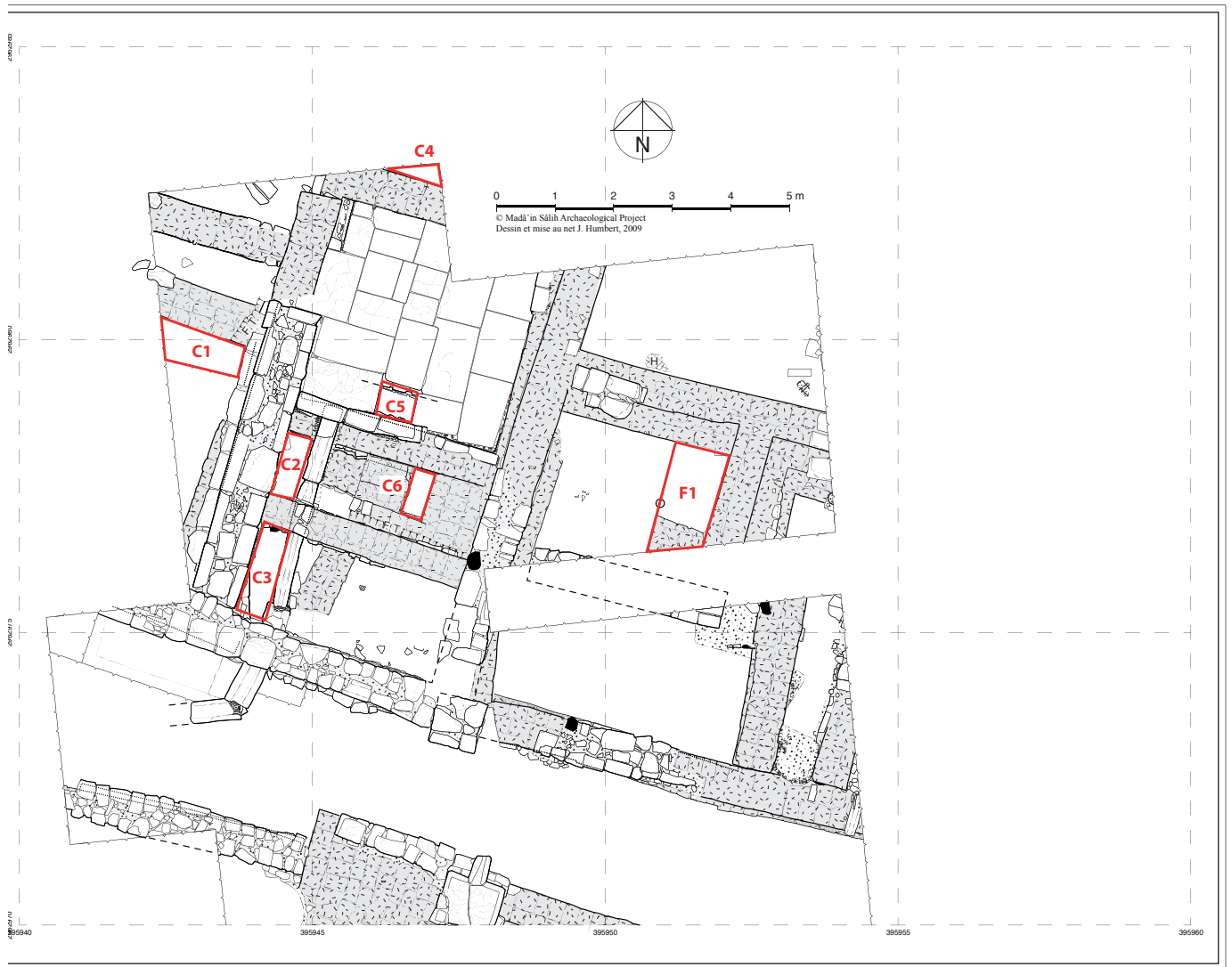


Fig. 6. Location of the soundings



Fig. 7. Surface 25033 in sounding F1. In the background, complete pot 25033_P01 under the foundations of wall 22028

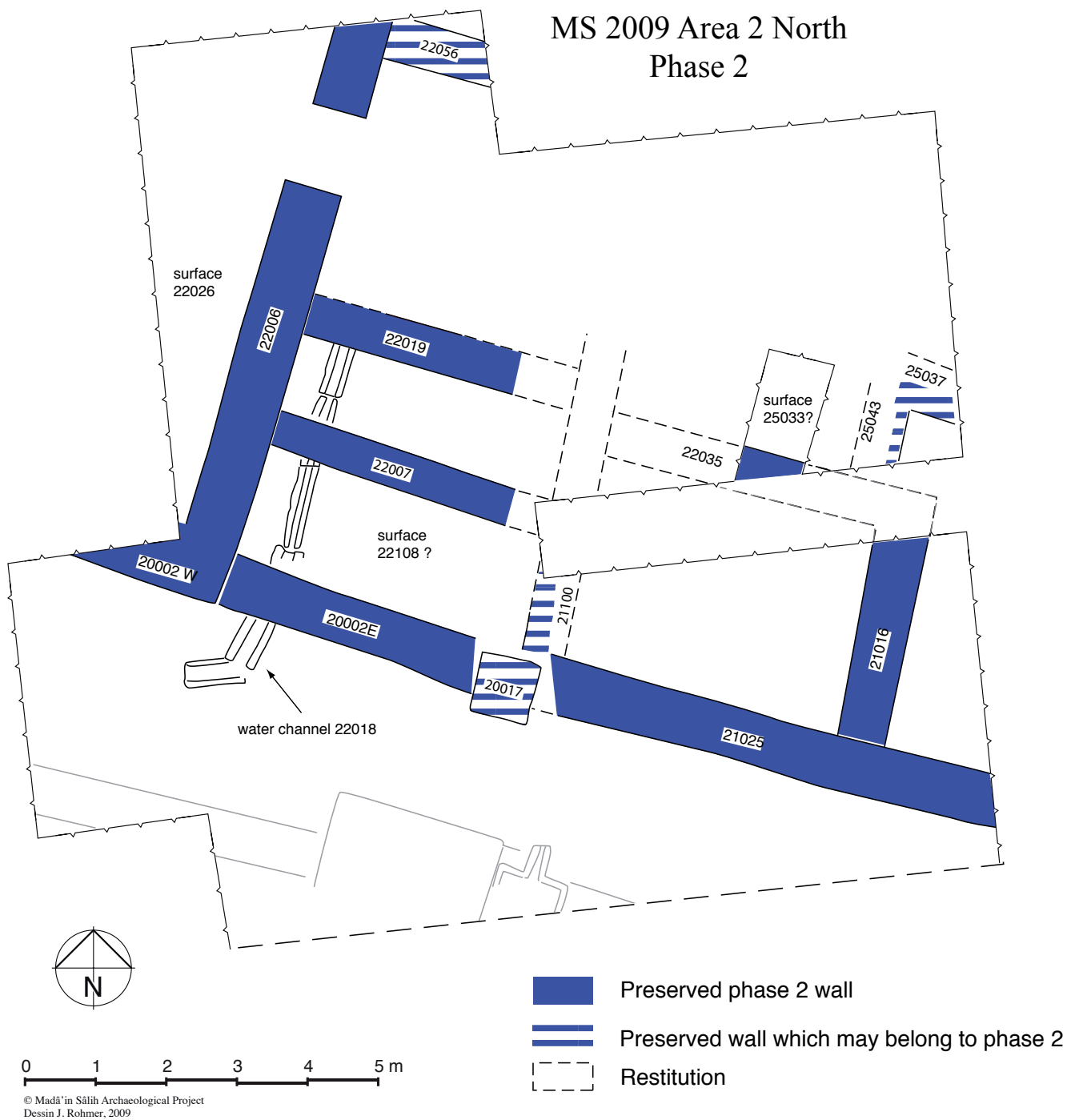


Fig. 8. Plan of phase 2

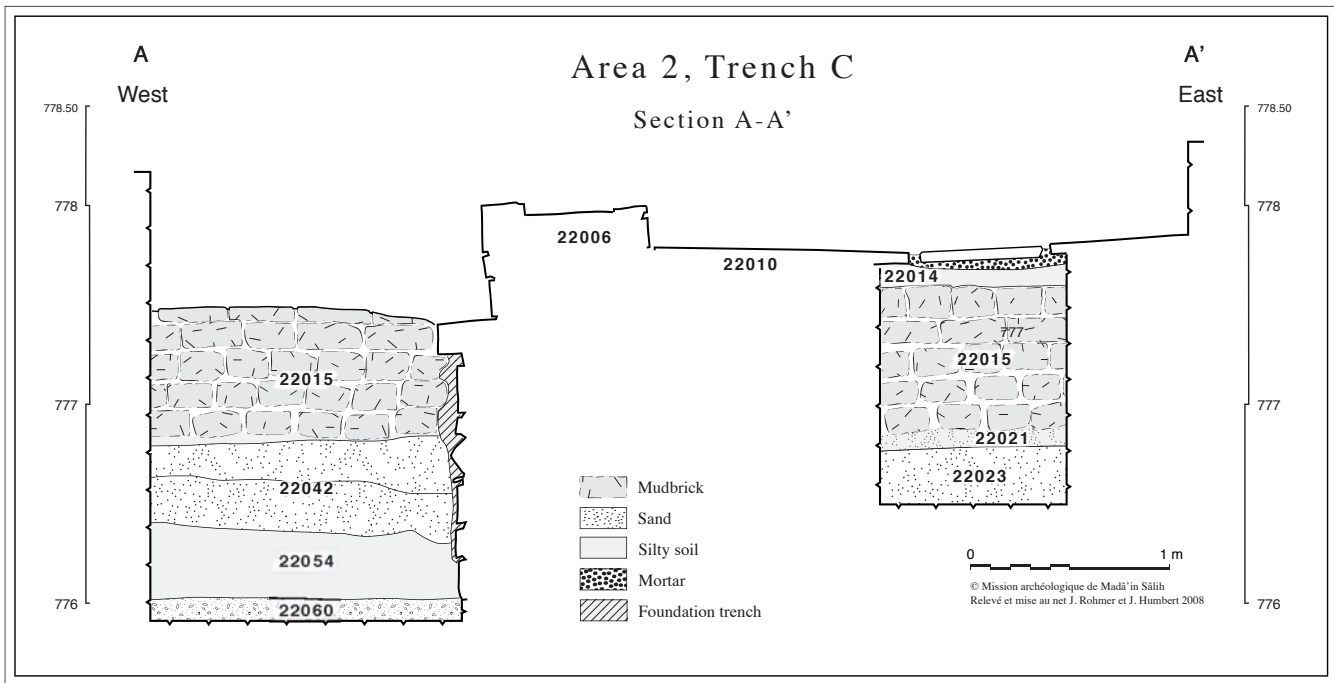


Fig. 9. Section A-A', trench C (22000)

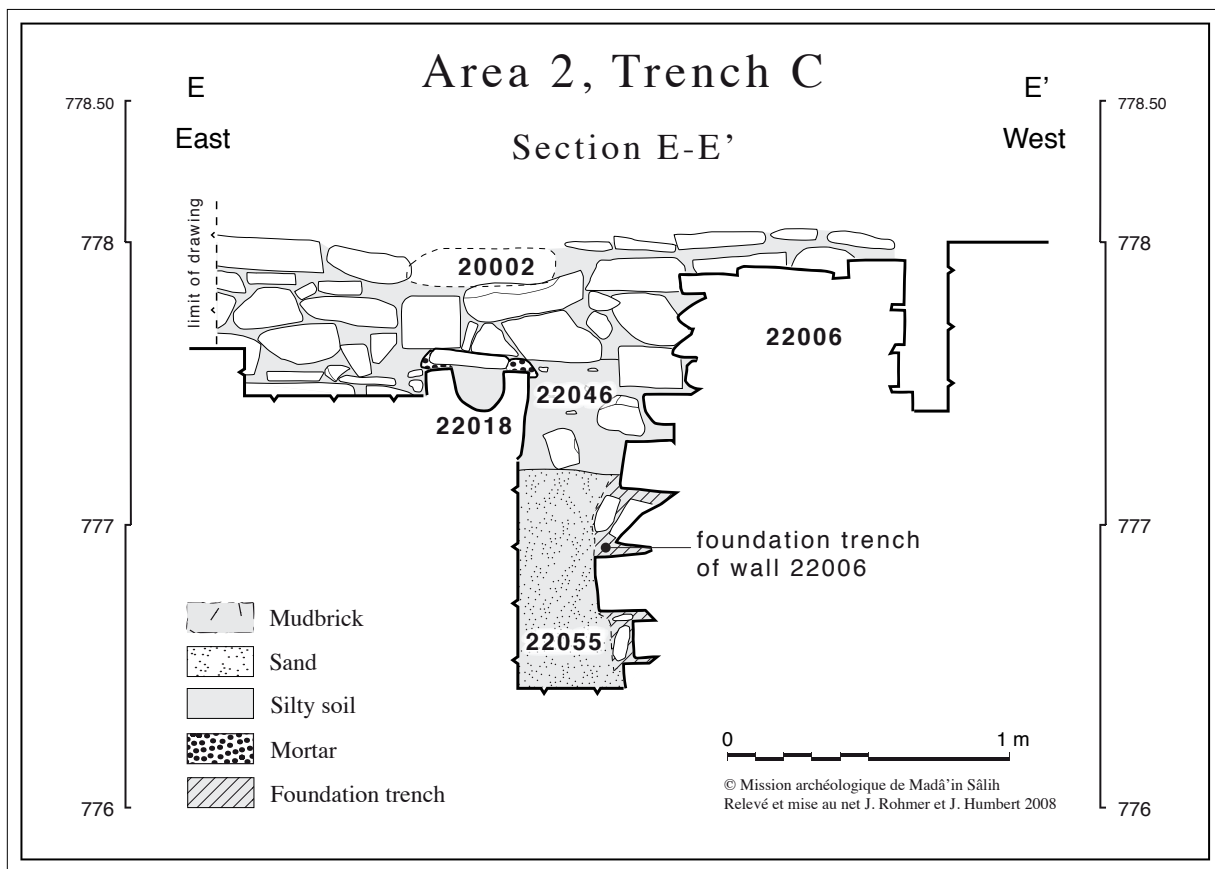


Fig. 10. Section E-E', trench C (22000)

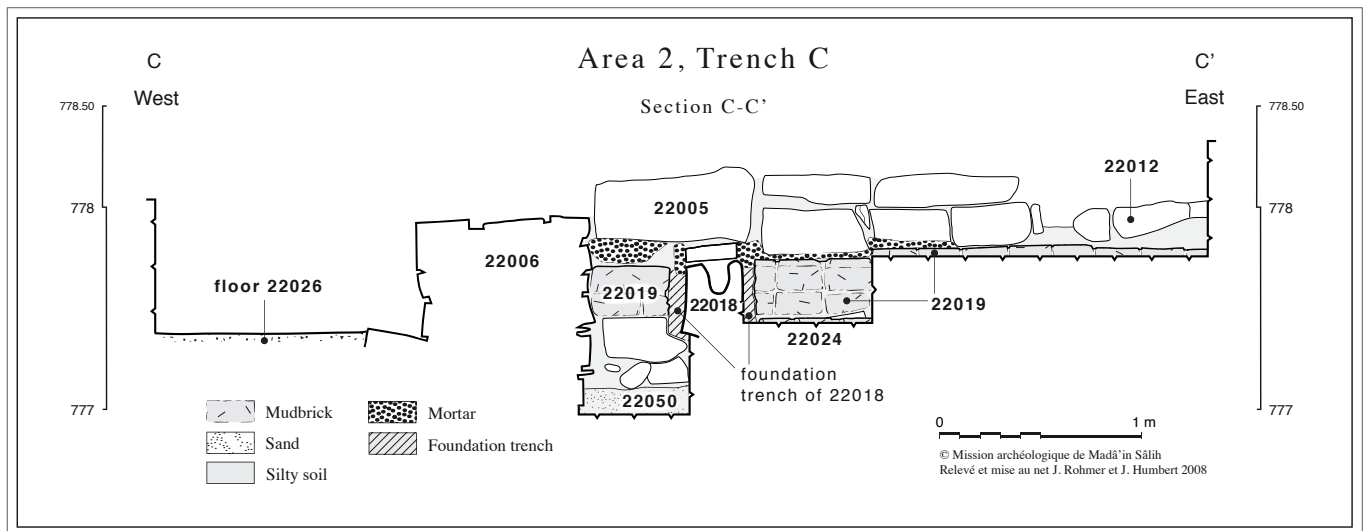


Fig. 11. Section C-C', trench C (22000)

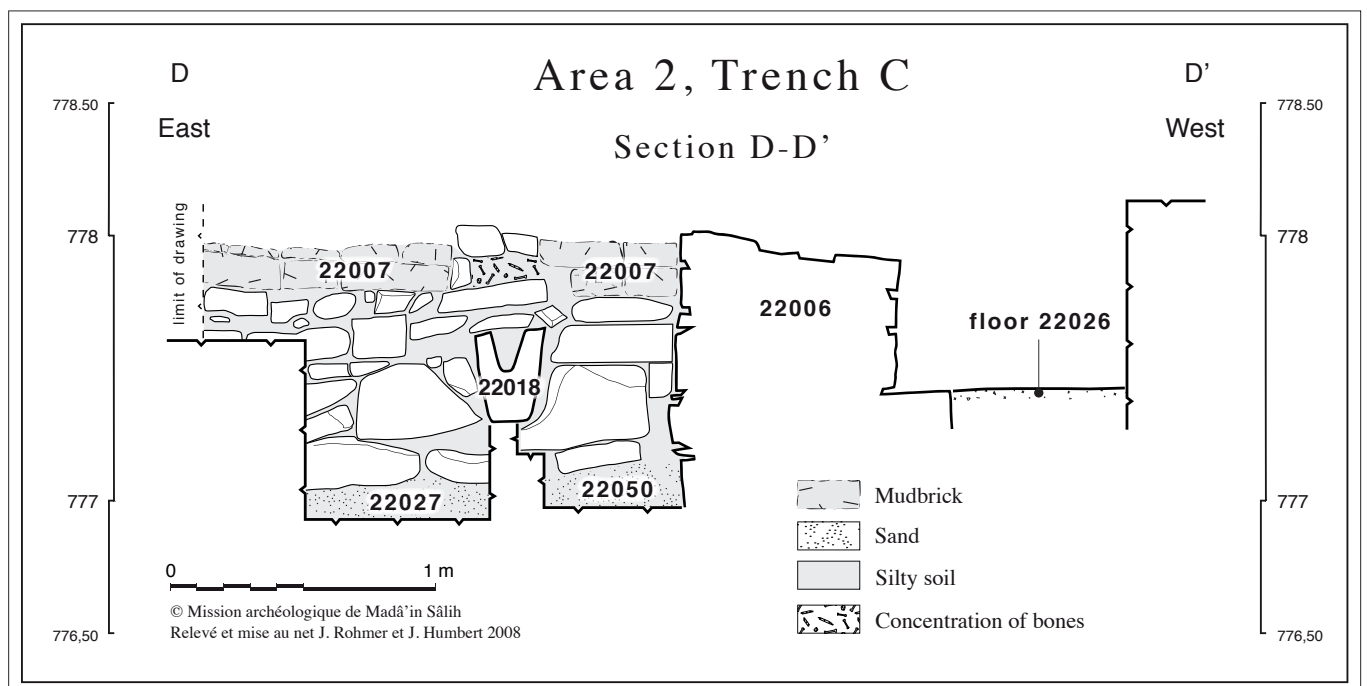


Fig. 12. Section D-D', trench C (22000)

MS 2009 Area 2 North Phase 3

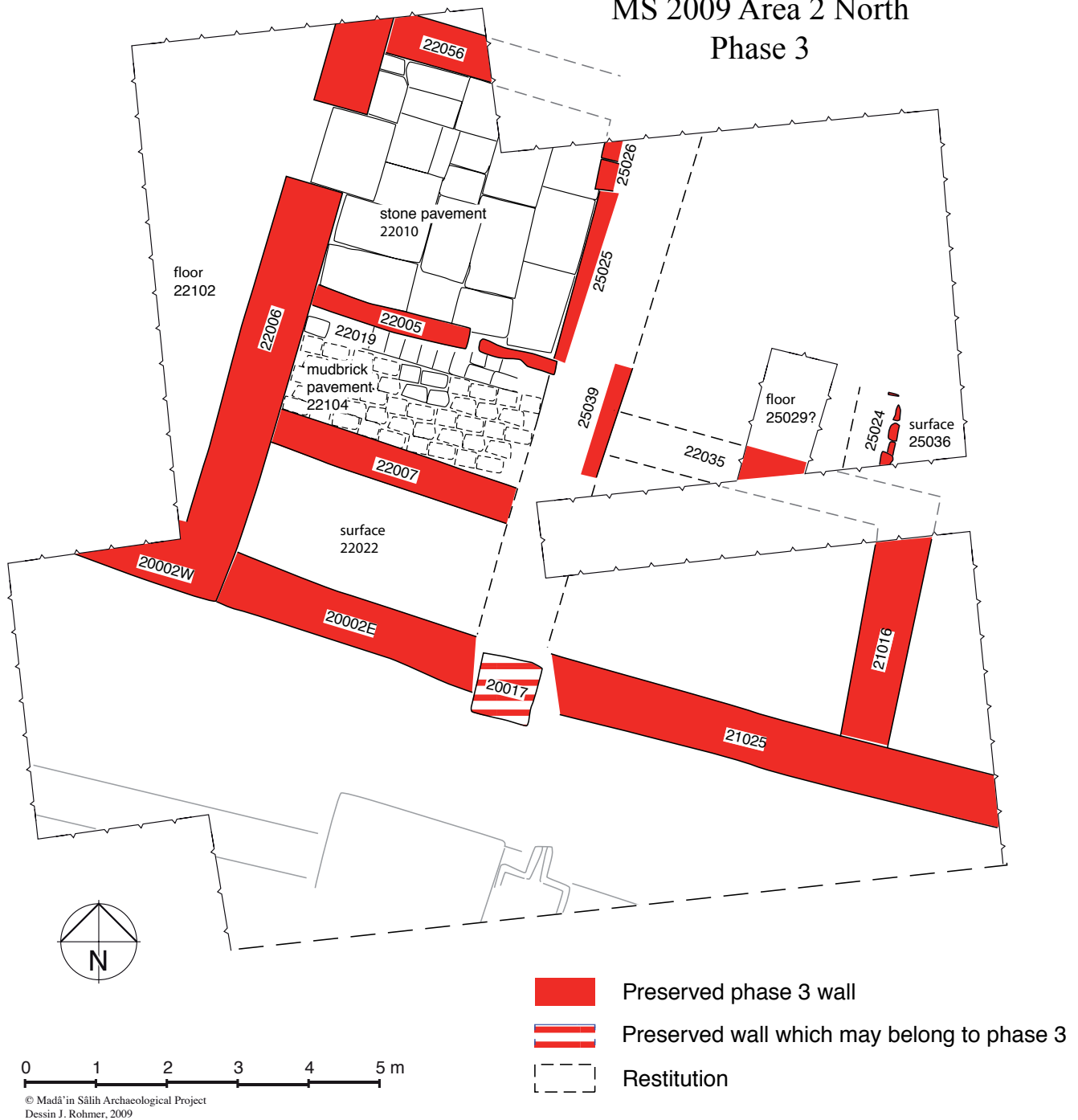


Fig. 13. Plan of phase 3



Fig. 14. Stone pavement 22010 with wall 22025 and its stone adjunction 25026 in the background (phase 3). Wall 22061 (phase 4) over 22025 and 22026

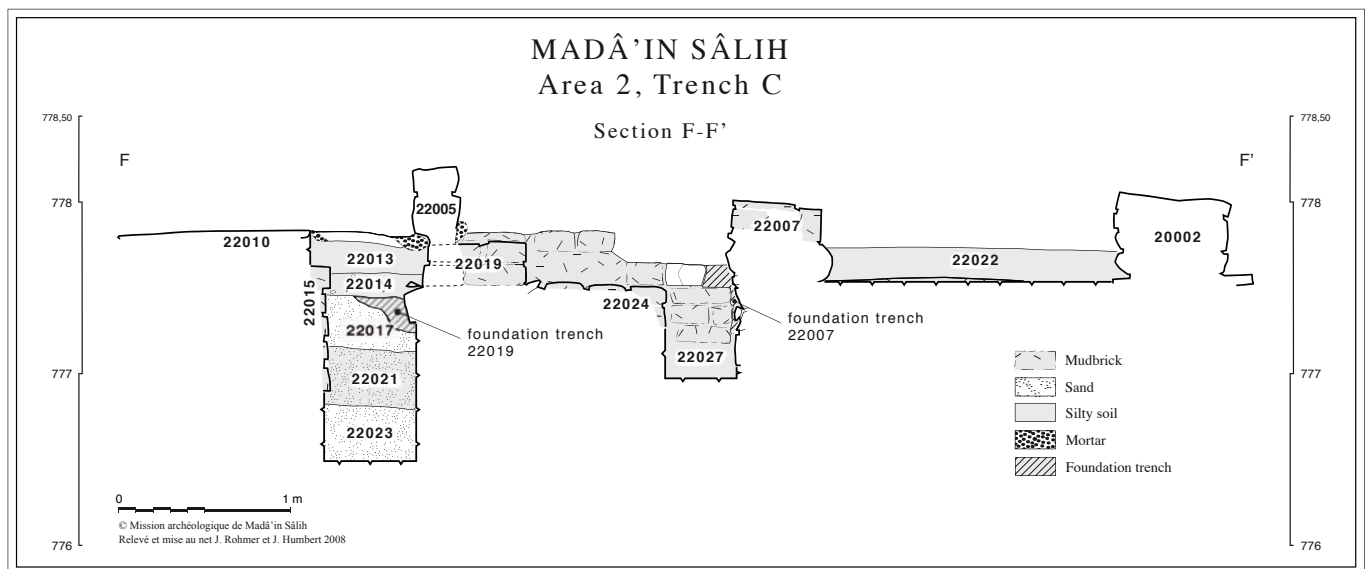


Fig. 15. Section F-F', trench C (22000)

Fig. 16. Mudbrick pavement 22104, viewed from the east.
A complete pot (22016_P01) and a stone slab rest on itFig. 17. Layer of abandonment over the stone pavement
22010

Fig. 18. Surface 25036. On the left, feature 25024. On the right, pedestaled along the baulk, in situ vessel 25018_P01

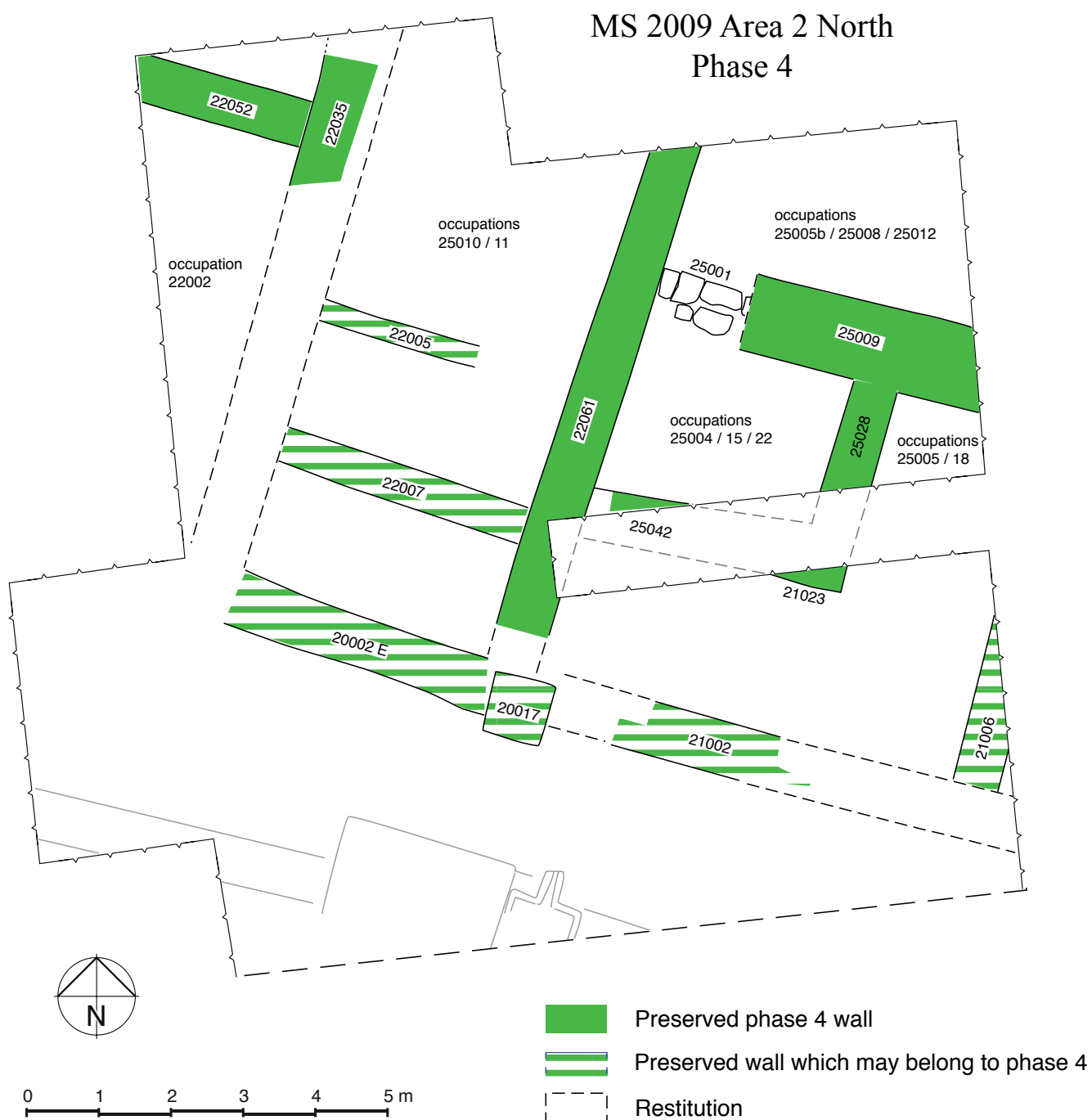


Fig. 19. Plan of phase 4



Fig. 20. Locus 25017 (occupation layer or part of the destruction layer of phase 3)



Fig. 21. Occupation layer 25011



Fig. 22. Surface 25010



Fig. 23. Mudbrick wall 22035, built over wall 22006 and blocking up its door

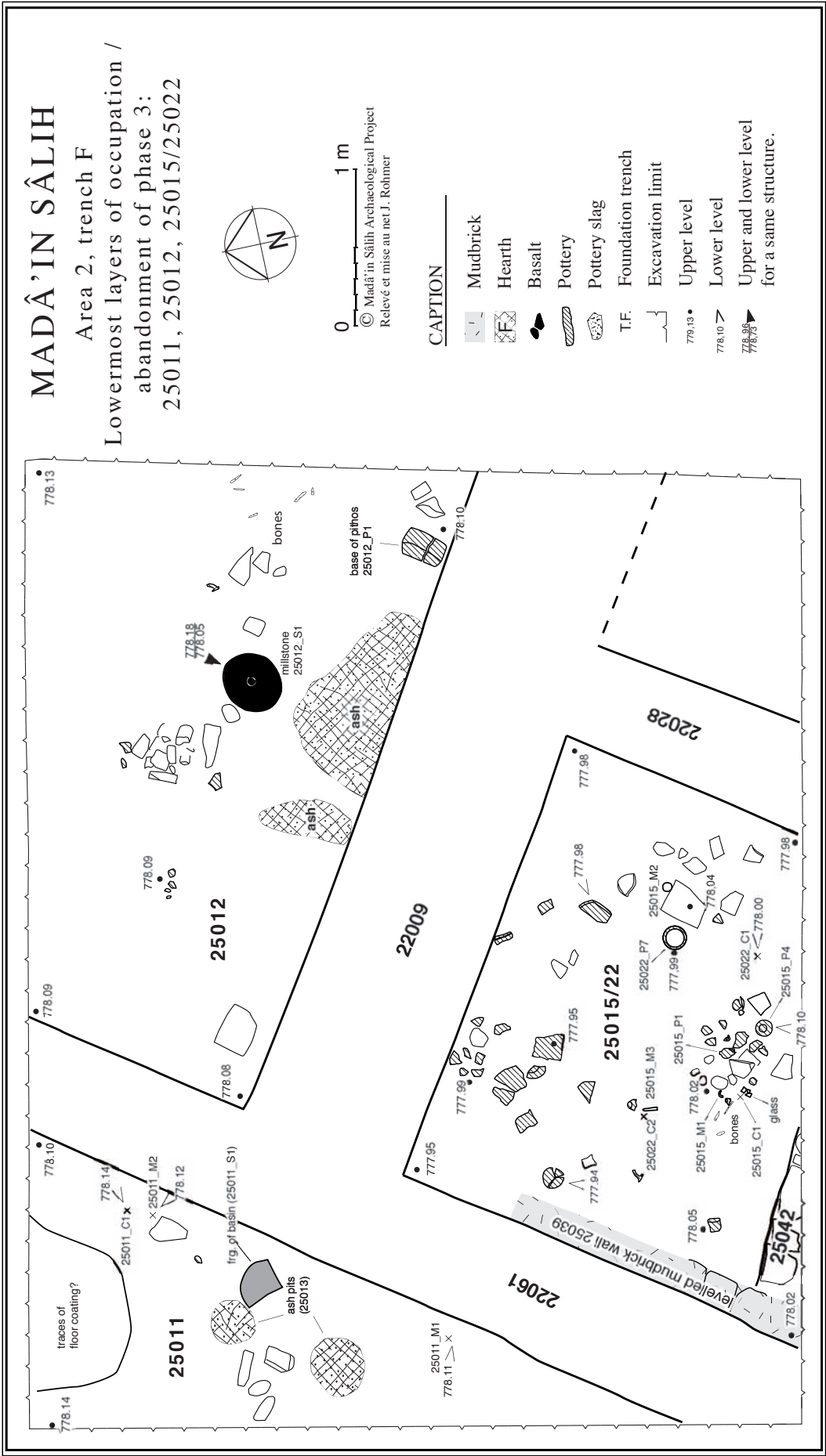


Fig. 24. Plan of the lowermost occupation/abandonment layers of phase 3 in 25000



Fig. 25. Surface 25008 with in situ artefacts. In the background, door-blocking (?) 25001



Fig. 26. Locus 25015



Fig. 27. In the foreground, destruction layer 25004



Fig. 28. Pottery pipe 25022_P07 in the western section of sounding F1



Fig. 29. In the foreground, wall 25002. Behind, along the baulk, circular hearth 25007 dug in abandonment/destruction layer 25004



Fig. 30. Stone wall (?) 22004 over levelled mudbrick wall 22007

Area 2 (23000)

Residential Area, Area 2, Trench D (23000)

Mahmoud Y. al-Hâjirî

Trench D (4 × 5 m) lies south of trench B (see Z. T. Fiema's report, fig. 1). The surface layers are represented by *loci* 23000 and 23001 and cover all the architectural elements which appear in the trench. These are made of six walls built in mudbrick, four of which form a rectangular room while the last two belong to a smaller room, installed in the northwestern corner of the first (fig. 1). A small oven, *locus* 20026, occupy the southwestern corner of the larger room. We shall show below that these architectural elements belong to the same phase as the early phase in trench B.

Phase I (= phase 1a in Z. T. Fiema's report: later 1st century BC)

Unit no. 1

The rectangular room is 2.85 m east-west and 3.40 m north-south. It is located on the south side of the street (fig. 2). Its walls are built in mudbrick and have no stone foundations. Three courses of mudbricks are preserved in each wall, except for the western wall, 20025, which contains four courses of mudbricks.

Three walls, 23012 (fig. 7), 23011 (fig. 8) and 24002 have their bottom level 777.30 m and rest on the sandy layer 23019 which is free of any trace of occupation (top level is 777.58 m and bottom level is 777.25 m). The four walls are clearly related to each other.

It may be that *locus* 23019 is the occupation layer of this room but no clear trace of occupation was found on it. It is the equivalent of *locus* 23020 in Unit no. 2 (top level 777.59 m) and of *locus* 23007 which is located in the street, between trenches B and D, north of wall 23003, with top level at 777.60 m.

Wall 23003 (see fig. 1, on the right) has the same direction as wall 23012 and lies immediately north of it, at a distance of only 20 cm, the gap between them being filled with sand and, in some parts, with mudbricks (on wall 23003 being the eastern extension of wall 20037 in trench A, see Z. T. Fiema's report.). Wall 23003, which has four courses of mudbricks, is built over *locus* 23006 (top level 777.40 m). It is therefore one course lower than wall 23012.

Wall 23010, in turn, is perpendicular to wall 23003 and has the same direction as wall 23011

(fig. 9). It lies immediately east of it, with a small gap filled with sand in between. The top course of the mudbricks was destroyed by floods. It shows on the surface small pieces of stones, broken pottery and bones.

The reason for the presence of the two walls 23003 and 23010 is not determined. Wall 23003 may have been added to enlarge the room or to set up the street. In his report, Z. T. Fiema, who puts these two walls in his phase 2 (late 1st century BC – early 1st century AD) and makes the following comment: “one must assume that [these] new walls [...] were built when all other mudbrick walls in the area [in trenches A and D, including 23012 and 23011] were still relatively intact and in use. Accordingly, the reason for this considerable strengthening of the northern and eastern sides of the two rooms in trenches A and D [with walls 23003 and 23010] must have something to do with the nature of occupation in these rooms rather than with the delineating of the northeast-southeast passage although the latter became a “by-product” of this development. Yet, why these rooms required such considerable reinforcing is unknown”.

Because of the presence of the oven, this room (Unit no. 1) had a domestic function.

Unit no. 2

Unit no. 2 is the small room which occupies the northwestern corner of Unit no. 1. It is square, 1.10 x 1.10 m. It is surrounded by walls 20025 (west), 23012 (north), 23016 (east) and 23013 (south, fig. 10). The last two show two courses of mudbricks (bottom level at 777.50 m, i.e. the same as *locus* 23019). Note that they are 20 cm higher than the walls of Unit no. 1. In its center, there was a small pit filled with ash (*locus* 23017), top level 777.60 m (fig. 4). There were two sherds inside the pit. 23017_P01 is a jug handle of greenish ware, belonging to the so-called “Parthian” ware (fig. 5), possibly dated to the first century AD, and 23017_P02 is a Nabataean fine ware unpainted bowl either imported from Petra or made locally, dated to the end of the 1st century BC.¹ A stone tool, which may be a pestle, was also found in the pit, and animal bones around it.

The *loci* in this unit are 23015, 23020 and 23021. In its northern part, there is a hard layer which contains small holes of 2 cm in diameter which appeared on the surface of *locus* 23015 and continued down to *locus* 23020 (fig. 6). This room may be a storage place or was used in connection with the neighbouring oven.

The oven (on the oven, see also Z. T. Fiema's report)

In the southwestern corner of trench D lies oven 20026. It is built with bricks and stones and has a diameter of about 1 m. Inside it were found melted pottery and ash. The function of the architectural elements which lie on the east side of the oven are not clear.

The so-called northwest-southeast passage

In trench B and D, it is located between wall 21025 in trench B in the north and wall 23003 in trench D in the south (see fig. 2). Note that the foundation of the building on the northern side

¹ Study C. Durand and Y. Gerber.

(with bottom level 777.25 m) is 15 cm lower than on the southern side of the passage (with bottom level 777.40 m). As far as top levels are concerned, the northern side (777.21 m) is higher than the southern side because of stone foundations 21003 which belong to our phase 2 (see below).

The layers in the passage are 23018, 23008, 23007, 23006, 23003, 23005, 23001 and 23000.

Relation of trench D with its surroundings

Most of the walls in this trench have extensions outside it, i.e. in the other trenches. Wall 23003, for example, extends in trench A to the west under number 20037. The same is true of wall 23012, which abuts wall 20018 in trench A, and of wall 23011, which extends southwards under *locus* number 24004.

Phase 2

South of trench D, there is one *locus*, 23002, which belongs to another phase (level 777.80 m). It is a stone made of six fragments forming a semi-circle. It is over *locus* 23004, which covers all the walls. Around it were found large pieces of animal bones. The stone was found on top of wall 23011, southeast of the trench. In the central part of the latter, *locus* 23003 is made of stones with a flat surface. It lies over 23012 and 23016 and is separated from them by an earth layer (top level 777.83 m). This may constitute a second occupation layer for the second phase, for which no architectural elements were found, due perhaps to destruction by the torrential rains or by the transfer of the stones.

Appendix : *locus* sheets

Locus 23000

Layer. Top levels 778.06 – 778.21 – 778.10 – 778.00 – 778.04 m.

Inclination: north to south.

Locus touches all baulks.

This *locus* is located south of trench B. Soil is composed of sand 60 % and silt 40 %. It is sloping from north to south and it is harder to the north. Few pottery sherds were found.

Locus 23001

Layer. Top levels 778.03 – 778.11 – 778.00 – 777.94 – 778.00 m.

Inclination: north to south.

Locus touches all baulks.

This layer is sloping from north to south. It is harder on the north side. Soil is composed of sand 60 % and silt 40 %. There is an ash spot about 30 cm long on the northeast side. Areas of particularly hard deposits are located in the southwest quadrant of the trench and mainly in its north-northeast part. In the southeast quadrant, accumulation of stones.

Locus 23002

Group of stones made of pieces of various sizes, irregular shape forms and forming a semi-circle, not related to each other. Open to the north. The soil between the stones is hard. Maximum diameter 70 cm.

Locus 23003

Top levels 777.82 – 777.88 – 777.87 m.

A wall of mudbricks, orientated east-west. Length 4.30 m, width 65-70 cm and height 50 cm. It has four courses. It is related to the west with 20037 and it extends inside the eastern baulk. It was built on sandy ground.

Locus 23004

Solid layer of earth, with sherds, on the north side of the trench. On the southern side, the earth is much softer. In the southeastern part of the trench were found large pieces of bones.

Locus 23005

Loose and soft layer in the eastern and the western part. Solid.

Locus 23006

Layer north of wall 23003 and under 23005. There are sherds and ash spot on it. Soil, sand and small pebbles on the eastern side, hard soil in the western. It equals *locus* 21011 in trench B. Sample of ash was taken north of 23003.

Locus 23007

Natural red sand layer of 80 % and 20 % sand soil. North of the trench.

Locus 23008

Coherent mud layer, with veins sand interspersed. It results from the melting of the mudbrick wall 23003. We find a thin layer of cohesive soil, underneath a thick layer of sand north of the trench.

Locus 23009

Top levels 777.78– 777.71 m.

Sandy layer southeast of the trench east of 23010. Components 80 % sand, 20 % silt.

Locus 23010

Top levels 777.79 – 777.69 m.

A wall of mudbrick which extends north-south in connection with wall 23003. It is cut off after 2.30 m and its width is 60-70 cm. It has two courses but it has been destroyed in the south. It lies over *locus* 23009.

Locus 23011

A wall of mudbricks which extends north-south. Length is 2.65 m, width is 60 cm and height is 32 cm. It has three courses and it was built on the sandy layer 23019.

Locus 23012

Top levels 777.76 – 777.71 m.

A wall of mudbricks which extends west-east. Length is 3.40 m, width is 60 cm and height is 37 cm. It has three courses and it was built on the sandy layer 23019. This *locus* equals 23003.

Locus 23013

Top levels 777.70 – 777.66 m.

A wall of mudbricks which extends east-west. Length is 1.63 m, width is 58 cm. It has two courses and it was built on the sandy layer 23019. It is in connection with 20025, separated from it by a 20 cm gap filled with sand.

Locus 23014

Top levels 777.69– 777.68 – 777.68 m.

Locus south of the trench, between the 23011, 23012 and 23016. Composed of 70 % of silt and 30 % of sand. Teeth and sherds were found in the center.

Locus 23015

Top levels 777.61 m.

Layer sandwiched between 23016, 23013 and 23012.

Mud layer is solid in most locations. It surrounds ash area 23017.

Locus 23016

Top levels 777.70 – 777.70 m.

A wall of mudbricks which extends north-south. Length is 1.60 m, width is 60 cm. It has two courses. It was built on the sandy layer 23019. Its connected with 20025 but separated from by a 12 cm wide gap filled with sand.

Locus 23017

Top levels 777.86 m.

Ash, charcoal pit in the middle of Unit no. 2, between 23013, 23016 and 23020. In locus 23015 were found pottery sherds and bones.

Locus 23018

Lose silty layer composed of 60 % of silt and 40 % of sand.

Free of organic materials and pottery.

Locus 23019

Sandy layer composed of 10 % of silt and 90 % of sand, under *locus* 23014. It is free of organic materials and pottery.

Locus 23020

Sandy layer composed of 30 % of silt and 70 % of sand, under *locus* 23015, between 23013, 23016 and 23012. It yielded some pottery sherds and bones.

Locus 23021

Sandy layer, under *locus* 23020, between 23013, 23016 and 23012. One piece of pottery and bone. The walls 23013 and 23016 were built on this *locus*.



Fig. 1 General view of trench D



Fig. 2 Trenches A (foreground), D (background left) and E (background right). View from the west



Fig. 3 Wall 23010 (left) and 23011 (right). View from the north

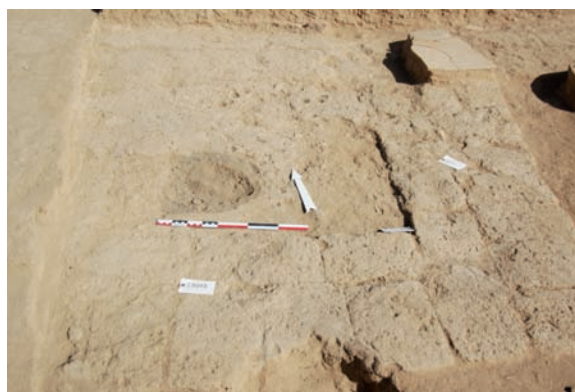


Fig. 4 Pit 23017



Fig. 5 Sherd 23017_P01, "Parthian" ware?



Fig. 6 Small holes on the surface of locus 23015

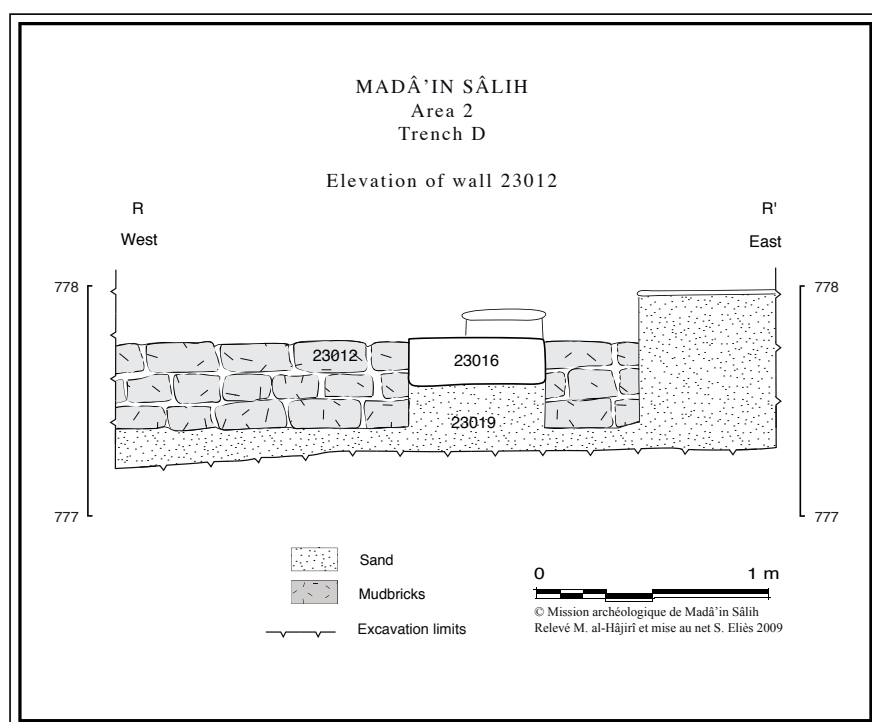


Fig. 7 Elevation of wall 23012

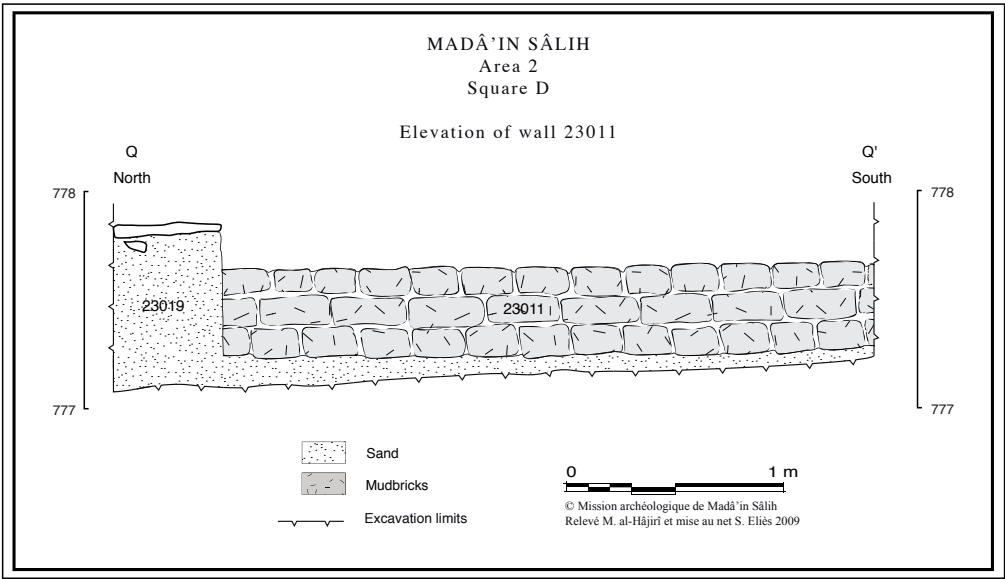


Fig. 8 Elevation of wall 23011

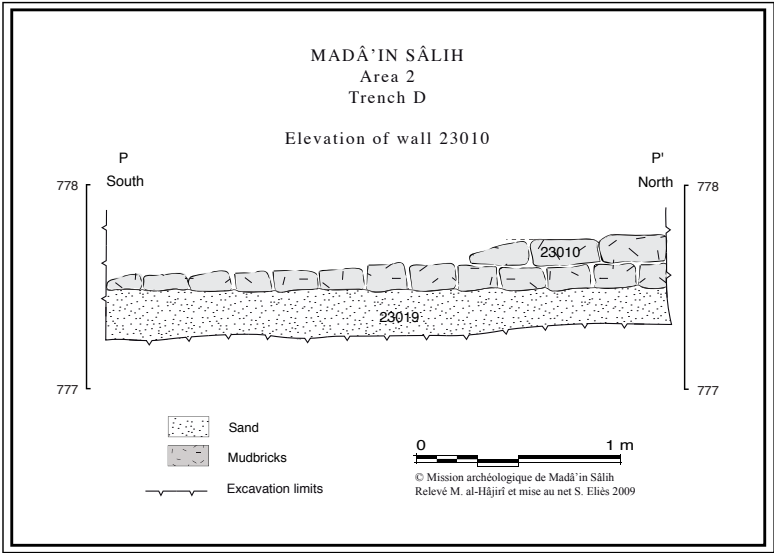


Fig. 9 Elevation of wall 23010

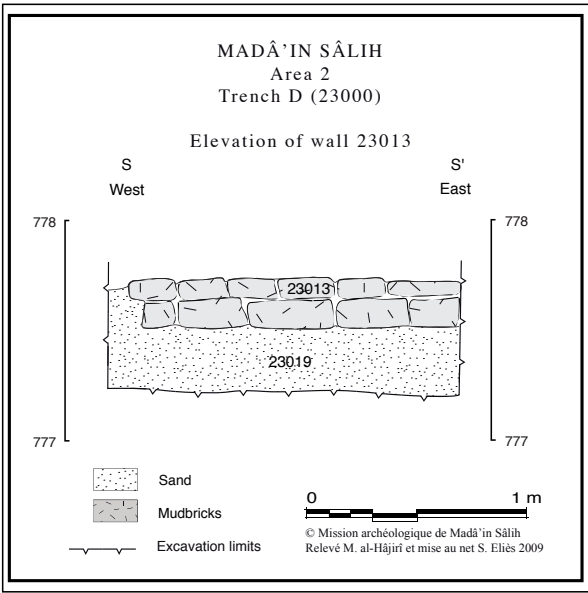


Fig. 10 Elevation of wall 23013

Research on the rampart (*loci* 31000 and 34000)

Research on the rampart (*loci* 31000 and 34000)

François Villeneuve

During the 2008 season, a programme dedicated to the rampart (built mainly of mudbrick) was launched. It followed on from the original work undertaken by D. al-Talhi between 1986 and 1990 within the framework of a Saudi-run excavation. We shall present again the results of the 2008 season here, as they are soon to be published in the first volume of the excavation report currently in press in Riyadh. Let us simply recall that in the southeastern sections of the rampart, the 1989-1990 soundings and the observations made in 2008 showed variations in the thickness of the walls (from 1.50 m to 2.35 m) as well as repairs and additions (including, on these sections, the construction of fairly regularly spaced bastions on stone bases). A probable dating to the 1st century AD for the whole of these works was given, i.e. the original construction (on previously disturbed soil), the repairs and additions. Nothing had been found which could be securely linked to a Roman re-working of the rampart around 175-177 AD that is suggested by the text of a Latin inscription discovered in 2003 by D. al-Talhi and published in 2005 in the journal *Chiron*. The 2008 season saw also the start of a study of the area of the small tell, the relative height of which is just less than 2 m, which marks the northwestern edge of the town proper and against the northern and western sides of which traces of the rampart appeared to be built. Sounding 32000, located in a fairly central part of the tell, remains incomplete but has revealed badly destroyed traces of what might be a craft working area, possibly dating from the 4th century AD. Beneath these are the mudbrick walls of a domestic occupation from the 1st century AD. The rampart was intentionally not included in this sounding, which was aimed at providing stratigraphic data on the centre of the tell.

Figure 1 shows the sectors of the rampart and the adjacent areas which were observed or tested during the 2008 and 2009 seasons. We will not discuss the stratigraphic section of trench 30 (southeast sector) which was completely excavated in 2008. However, we will give some supplementary details on the buried pot 31019 in trench 31 (eastern sectors) and briefly present the 2009 results from the northwestern tell, in trench 32. We will also discuss the work started in trenches 33 (north) and 34 (south) as prospects for the next season.

The buried jar 31019 (fig. 2)

In 2008, a unique installation was identified and explored, about ten metres to the west of the inside of the rampart. This was a buried jar without a base, resting on a few mudbricks, whose function remains enigmatic. In 2009, the partial restoration of this pot, once it was lifted, showed that, contrary to what had been written and drawn in the 2008 report, this was not a vase open at both ends. As is illustrated in the reconstruction drawing of the jar *in situ*, it is indeed an upended pot, the bottom of which had been completely removed and the edges of the break smoothed. However, this observation has not shed any further light on the use of this re-employed jar.

The northwestern tell (area 32)

The excavation of the tell lasted one month, was technically very difficult and produced very few fragments of artefacts. Two soundings were involved (fig. 3): 1/ the “top” sounding (32000), begun in 2008 and completed in 2009 to a level below that of the base of the tell; 2/ the long “North Edge” sounding (32100), ten metres further north and on the same axis, the purpose of which was to verify the presence of the rampart along the northern edge of the tell and to study both the rampart and its immediate vicinity. This sounding was also completed. The north-south stratigraphic section at the eastern end of both soundings has established the consistent height of a 1st century AD occupation (dated by the scant coins and find fragments of sounding 32100 and the more abundant material from sounding 32000) and of a later occupation (4th century AD?) in the form of a work area marked by entirely destroyed remains of rudimentary installations and material debris. The 1st century occupation was probably domestic and its northern edge abuts the thick mass of the entirely flattened rampart 32104.

Sounding 32000 (“top”) was excavated down to a level clearly below the base of the tell in order to test the hypothesis that the 1st century domestic occupation, to which the house wall 32106 and the courtyard wall 32109 both belong, may have stood on older levels and constructions. A large fragment of decorated Nabataean bowl (32022_P01), which can be approximately dated to the middle of the 1st century BC but which was found in a 1st century AD context seemed to bear witness to the existence of the older levels. The completion of the sounding completely eliminated this hypothesis (fig. 5). Indeed, directly beneath the thin preparation levels (32014, 32018 and 32035) is a thick layer of fissured clay (32023, 32026, 32028, 32034, 32035) marked by layers of gypsum crystals which do not contain any anthropic elements, not even the smallest particle of charcoal. This level, which is some eighty centimetres thick, is not associated with any construction, and there is no reason to consider that the clay was deliberately brought here to construct this little tell simply as a foundation for dwellings. However, *locus* 32036 and its equivalents rest on a surface which is exactly level with the base of the tell and with the perfectly level surface of the surrounding *qâ’*. The tell is therefore literally placed on the *qâ’*. In order to understand this mysterious natural formation (which is either the result of the strong lateral erosion of a tell that would originally have been larger and later than the *qâ’*, or a man-made tell

the purpose of which is enigmatic) we have called upon the services of geomorphologist Eric Fouache of the University of Paris 10 for the 2010 season. In any case, the 1st century BC bowl appears, for the moment, to be an isolated and erratic occurrence in an area where occupation goes back no further than the 1st century AD.

The “North Edge” sounding (32100) initially revealed the remains, incomprehensible because they are so destroyed, of a work space (see fig. 6 for the plan and fig. 10 for the section, *loci* 32102 and 32103) restricted to the southern half of the sounding, that is on the remains of the rampart 32104 and, further south, on the remains of the probable dwelling of which walls 32106, 32107 and 32108 survive. This may have been an area where stone was dressed or cut (for the production of lime?). Figures 7 to 9 show three fragments of white limestone, much cut, of what is possibly a small carved element. Pink sandstone adhesions are visible on the lower surface, which could be the traces of a cubic base designed to support this carved element. It brings to mind the very advanced cutting of a small altar with a sandstone base and a limestone top, the upper concavity of which may represent the central cavity of the altar.

Beneath this level, undated for the time being, we find (see fig. 5 for the plan of the northern part and fig. 10 for the section) the mudbrick walls 32106, 32107 and 32108 to the south and, immediately to the north, the very thick mudbrick rampart 32104. Walls 32106-32108, at right angles to each other and also almost perfectly perpendicular to the ramparts, are aligned on the same grid as wall 32006 in sounding 32000, although they are not a continuation of it. It is therefore almost certain that soundings 32000 and 32100 concern a single area or a unit of dwellings from the 1st century AD. The southern face of the rampart 32104, which was re-worked at least once to slightly increase its thickness, was cut into to receive the north ends of walls 32106 and 32107: the rampart, therefore, predates the area of the dwellings, perhaps by a very short time. In any case, no finds nor coins have been found from before the 1st century AD.

The rampart has no stone base in this area and is badly ruined, the northern slope of the tell in particular having damaged the areas adjacent to the northern face of the wall. The hardening, salt crystallisations from rising moisture, encrustations and damage from trampling make it pointless to try to identify separate phases, other than the reworking of the southern face. It is possible to say only that the rampart is 3.80 m thick at this point, thus considerably thicker than elsewhere, either on visible sections or in soundings. This anomaly cannot, for the time being at least, be attributed to a chronological difference from the rest of the rampart, nor to a wish to protect this tell in particular. The long section of the rampart which goes from the northwest corner of the tell towards the southeast, is visible without excavation and is of a normal thickness – about 2 m – so the extra thick section may have been designed simply as protection against the more aggressive erosion in the northern sector of the tell. This question will be verified by the geomorphological study.

Given the very small number of artefact fragments available for dating the walls 32104 and 32106-32108, the discovery of a large piece of the left radius of a large camelid (identified by J. Studer, Museum of Natural History, Geneva) in a depression in the virgin soil beneath the floor of one of the two rooms defined by walls 32106-32108 (the room on the edge of sounding 32100) is significant. C14 dating of this fragment will provide a *terminus post quem* for the construction of walls 32106-32108, to be compared with the many small indications that point to a 1st century AD date.

Initial work in area 33 : northern section of the rampart

Although the northern rampart has completely disappeared on (or beneath) the *qā'*, it is clearly visible further to the east. Given that further investigations on ordinary sections of the curtain wall are likely to produce results that simply repeat those obtained from the eastern sector (trench 31), the choice of trench 33 (fig. 1) was determined by the search for a gateway to the necropolis of the Qasr al-Bint. The spectacular little sandstone outcrop with its eroded base (Marbat al-Hisân) cannot have failed to make an impression on the spirits of the inhabitants of Hegra, and the small change in elevation a few metres to the north of this outcrop (two little rounded hillocks in the axis of this visible part of the rampart, separated by a depression containing some tenuous traces of foundation stones) raised hopes of a possible gateway. Towards the end of the season, two soundings were laid out on the top of the two outcrops. One, on the western outcrop (sounding 33000) was worked on for two days by Muhammad Jaafar 'Issa and 'Abbâs Ahmad Salmân, archaeologists from the Department of Antiquities of Bahrain, who were in training with the team. The work did not last long enough to produce results which can be interpreted. Work will be resumed, together with the planned adjacent sounding, in 2010.

However, the Marbat al-Hisân outcrop has been carefully observed and has produced results which had never been previously recorded (figs 11 and 12). In the upper part of its western face, running from the top to the bottom, is an almost horizontal channel cut in the rock. At the base of this channel, a vertical water chute has been fashioned. This is therefore an installation designed to collect the scarce rainwater. Lower down, three large rectangular depressions have been carved out (the tool marks are very clear) at an angle one above the other and separated by ridges. Lower still, at head height, three inscriptions are visible (epigraphic point 148.1): one in Greek to the left, and two in Nabataean on the right.

The Greek inscriptions is a hard to decipher: MNHΘH / AIAMH / KΩMHΣ / AΔAMHΛON (?) : "Let us remember Aiamè, from the village of Adamèlon".

Below, five letters (Greek?) from another inscription are still visible, this one running vertically. The text is consistent with a place where people passed frequently and where a Greek-speaking traveller coming from a village would naturally carve her name, but this is clearly not sufficient to establish the presence of a gateway between the outcrop with sounding 33 and its neighbouring outcrop to the east.

Observations on area 34 (southern section of the rampart) with a view to planning the 2010 season

Productive work can be foreseen on the southeastern section of the rampart, on its southwestern end and on the southern sector. In the first place, precise topographic records are required, followed by surface scraping. It seems that not all the bastions which exist on the southeastern sector have been located. “Tower C” (southeastern rampart) could be a double tower and therefore, perhaps, a gate. The southern rampart does not seem to be perfectly positioned on the general plan of the visible remains of the site. In fact, this sector (survey by F. Villeneuve on 14/02/09) appears to pass *over* the southern part of the big sandstone outcrop known as “Hill B” and not slightly to the south of it. The sector to the west of Hill B is promising: there are many stone foundations for the rampart of a thickness that could suggest the existence of casemates. Finally, just to the north of this sector of the rampart is a fairly large area with many foundations constructed of fairly regular stone blocks, outlining small, rectilinear rooms with an abundance of red ceramics on the surface. This leads to a possible hypothesis of barracks.

The last two field seasons of the current research programme, in 2010 and 2011, should allow us to present a first assessment of areas 33 and 34. An initial assessment, difficult and still provisional, has been produced for areas 30, 31 and 32 and for the soundings made by D. al-Talhi in 1986-1990. At the end of this work, we will have a fairly clear overview of the function, the gates and the chronology of the rampart for the whole of its length, at least by sampling, with the exception of the western sectors, irretrievably lost to the construction of the Hijâz railway.

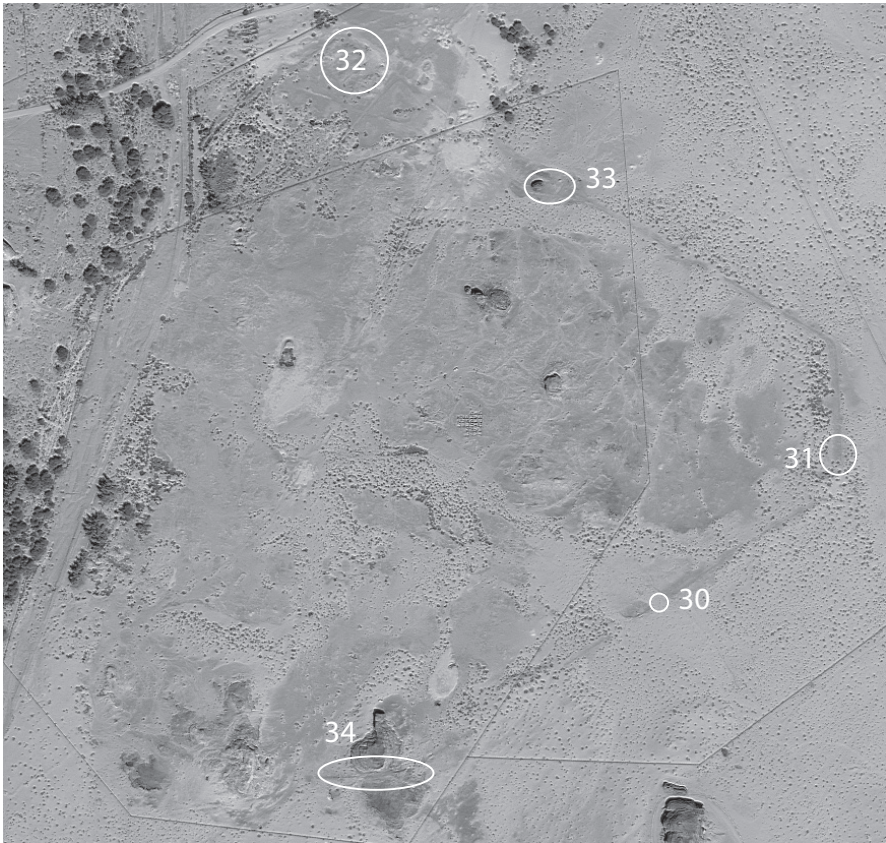


Fig. 1. Location of areas 30000 to 34000 on the rampart of Hegra, on the satellite image

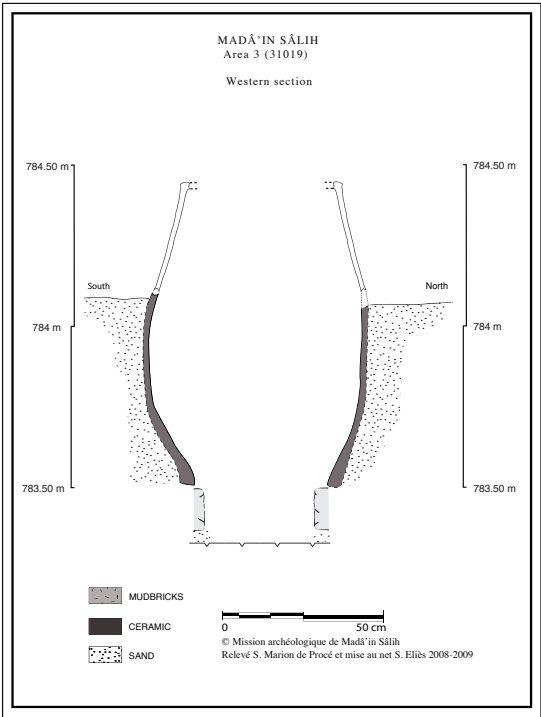


Fig. 2. Section across the buried jar 31019

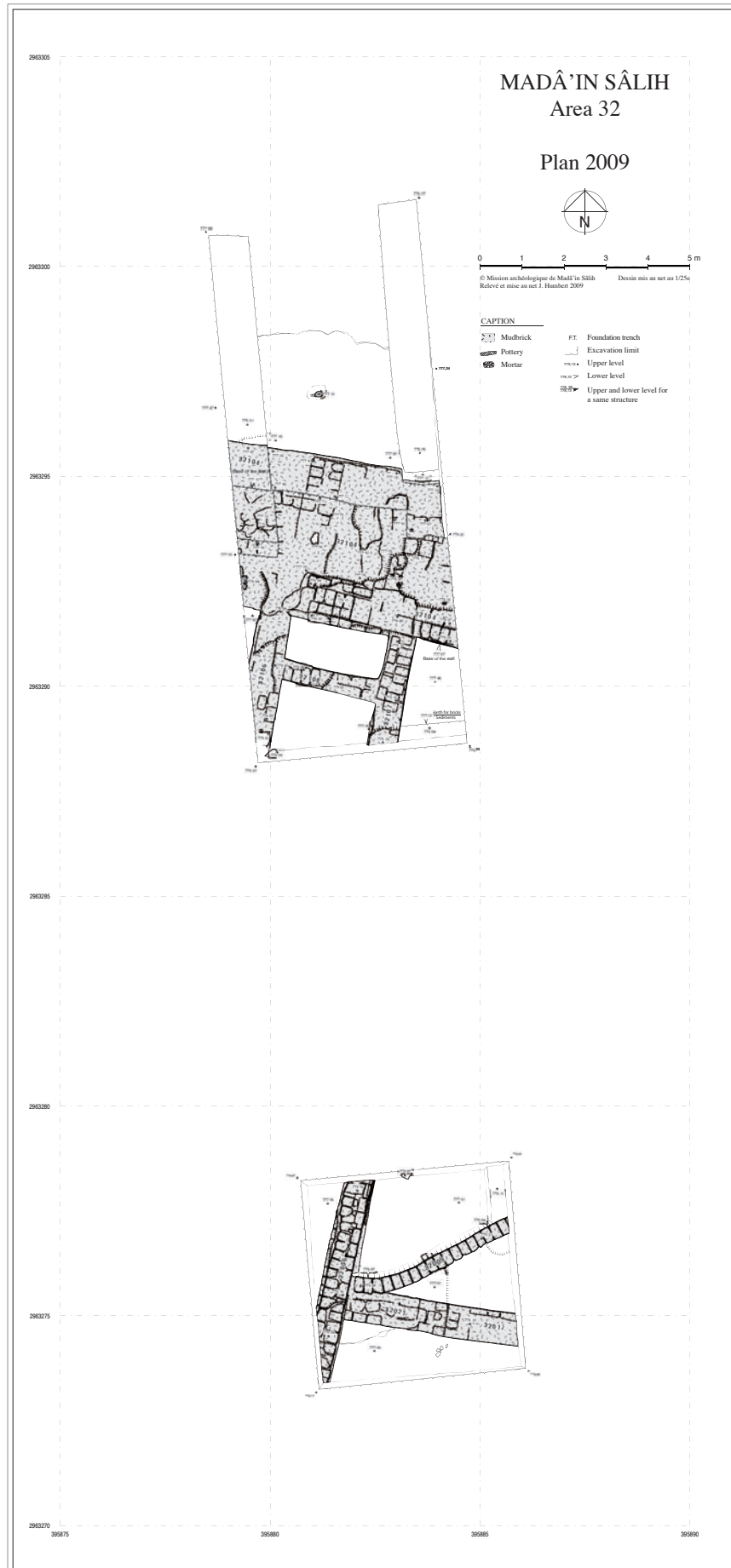


Fig. 4. North-south section on the east side of soundings 32000 and 32100 (see A3 plates at the end of the report)

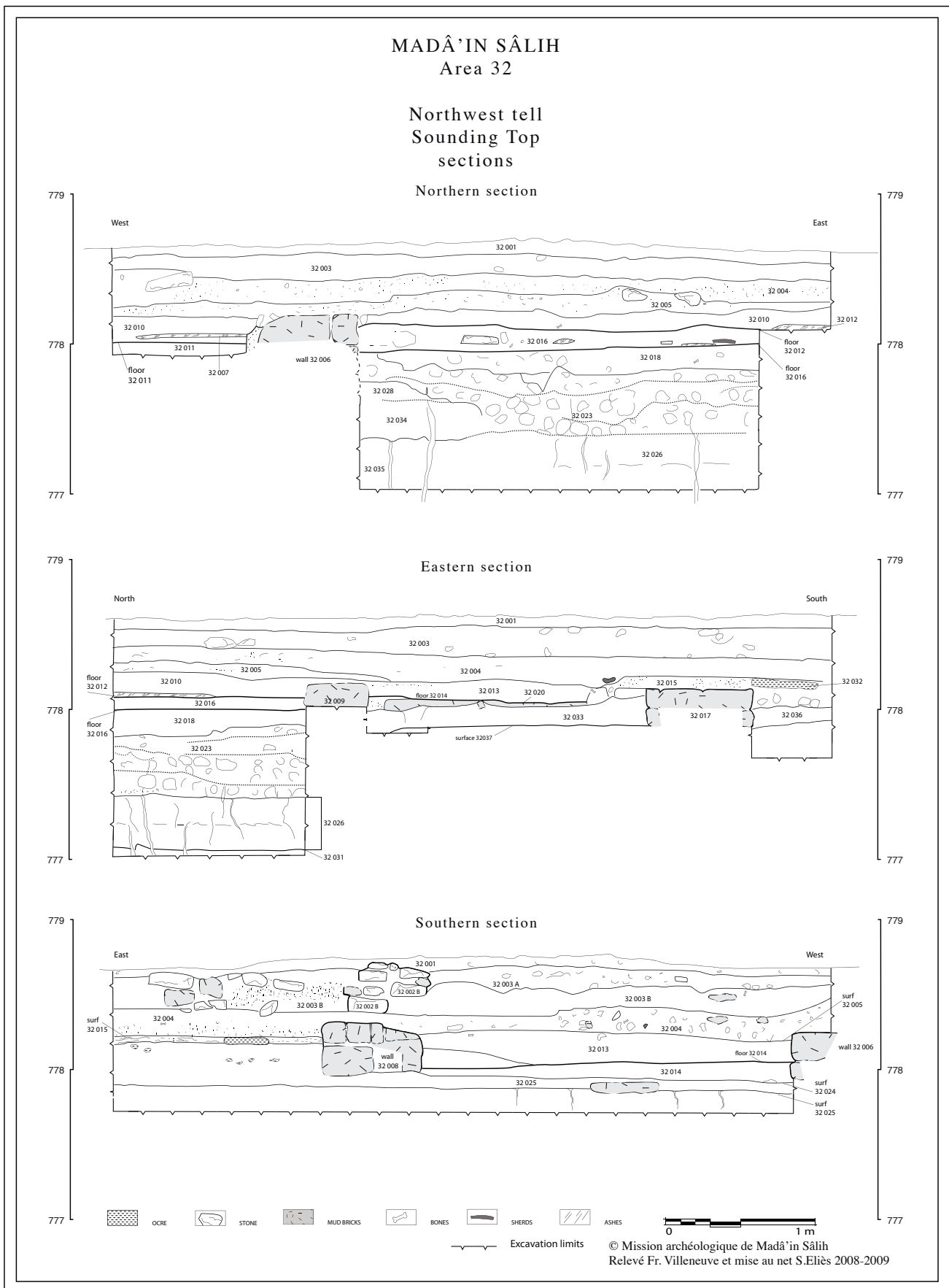


Fig. 5. North, east and south sections of sounding 32000

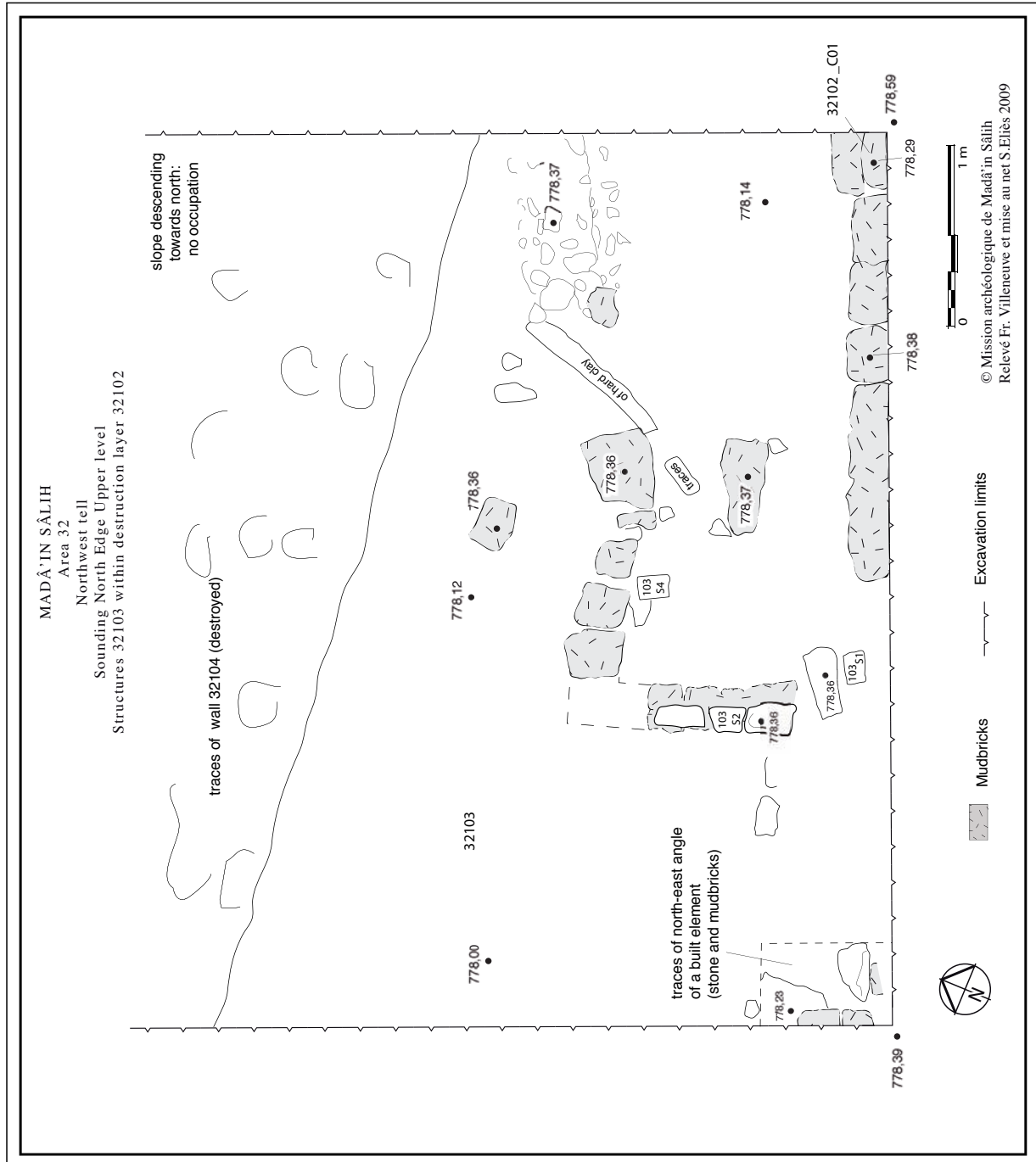


Fig. 6. Plan of upper, destruction, levels in sounding 32100



Fig. 7. Drawing of stone fragment 32103_S02 (a piece of moulding?)

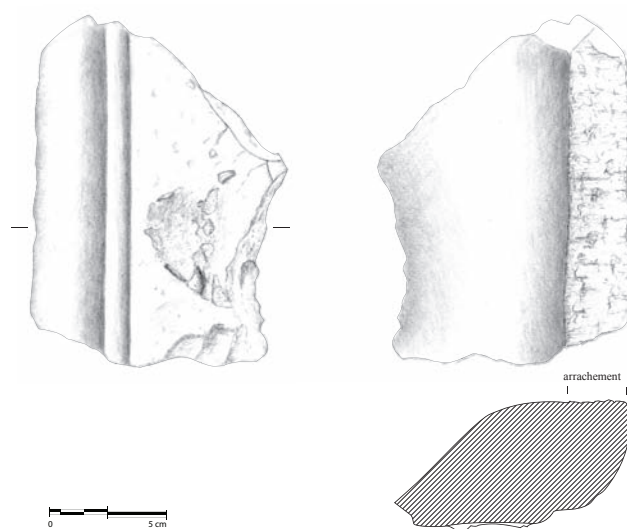


Fig. 8. Drawing of stone fragment 32103_S03 (a piece of moulding?)

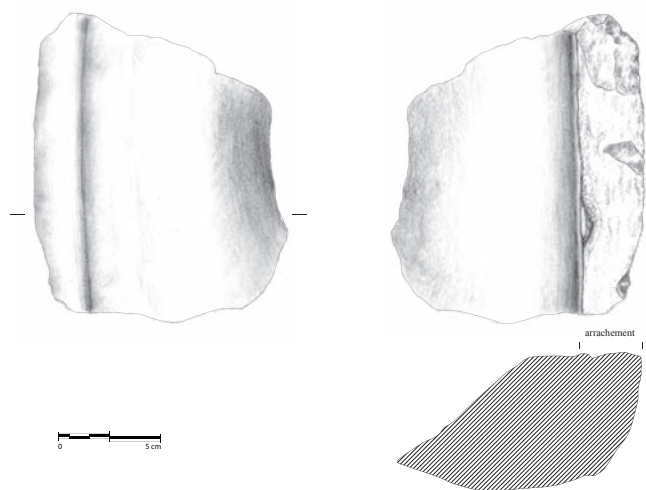


Fig. 9. Drawing of stone fragment 32103_S04 (a piece of moulding?)

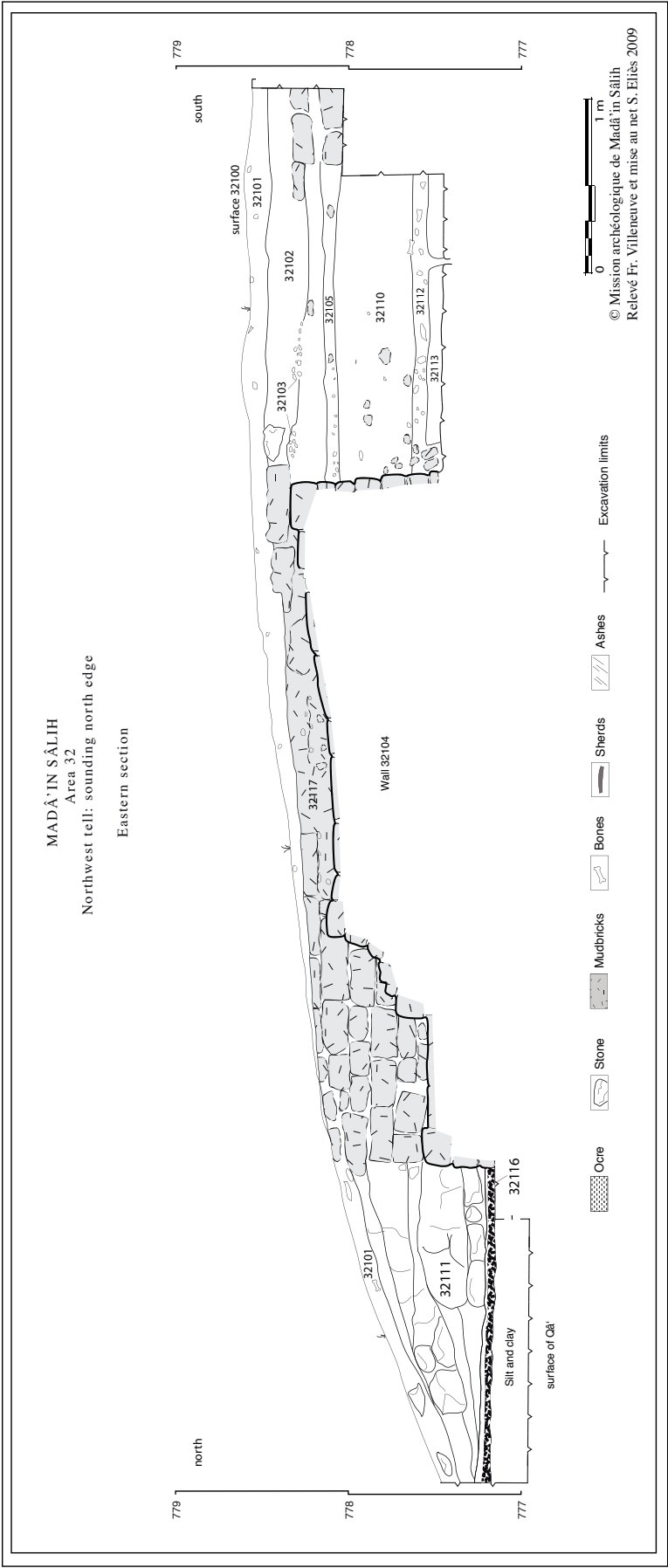


Fig. 10. East section of sounding 32100

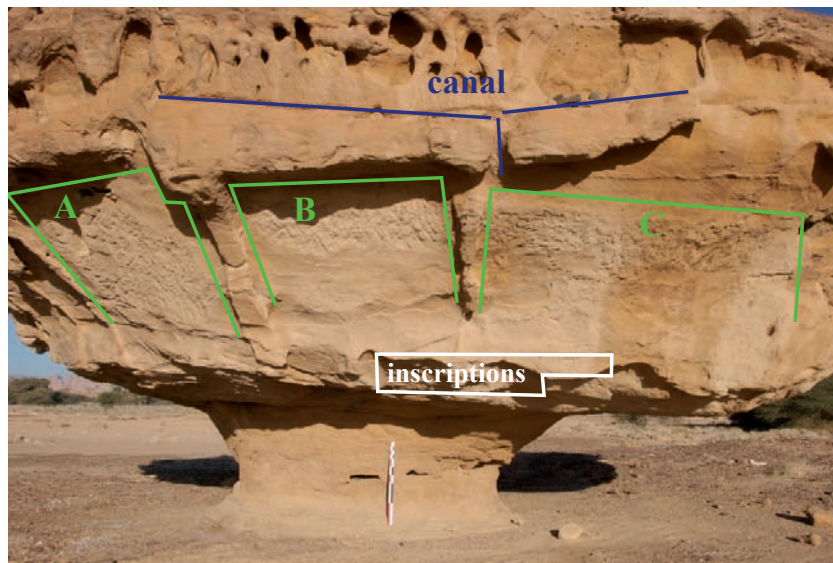


Fig. 11. Sketch on a photograph of the installations opposite the sandstone outcrop of Marbat al-Hisân (panels A to C with traces of dressing marks and epigraphic point 148.1)

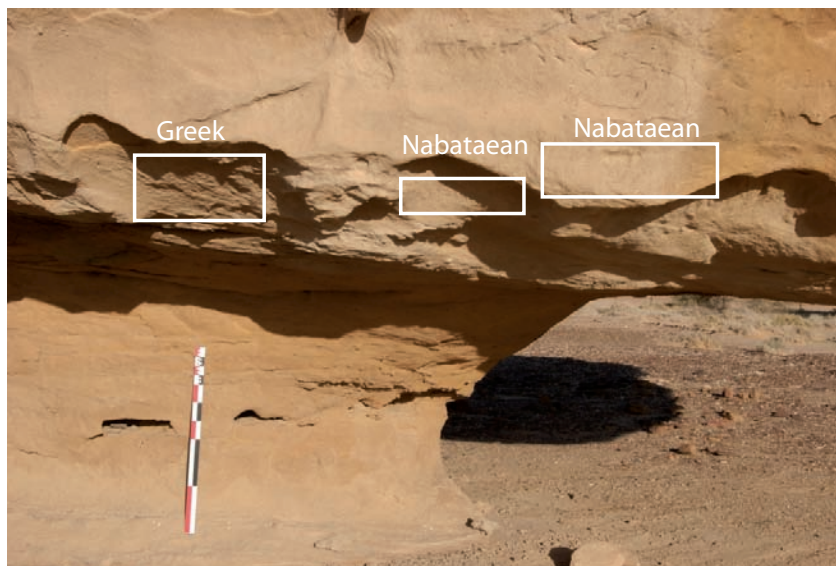


Fig. 12. Sketch on a photograph locating the three inscriptions opposite the sandstone outcrop of Marbat al-Hisân

Area 7 (70000)

Residential Area, Area 7

Dhaifallah al-Talhi and Abdulhadi al-‘Anzi

Area 7 (*loci* 70000) is located almost in the centre of the residential area (see introduction, fig. 2), to the east of the 1980s excavations of the Department of Antiquities (fig. 1), the result of which was published in the journal of Saudi Arabian archaeology, *Atlat*.¹ Part of a residential unit, made of seven rooms, was clearly seen as a result of these excavations (fig. 2).²

The main reason for selecting this area for excavation was the appearance of three parallel walls extending from west to east until they abut the eastern wall of the residential unit revealed by the previous excavations (fig. 3). It was assumed that those three walls were part of the residential unit and that clearing them would reveal how far this unit extended to the east. A street on this eastern side, running alongside the residential unit, had not yet been revealed and it was thought that it might appear in this direction.

A datum point (*asl* in Arabic) was established on the site. It is 780 m above sea level. All depths on the site were recorded relative to this datum point.

A trench of 8 m long and 2 m wide was selected for excavation. It includes two walls extending from west to east (see figs 3-4). Work started by removing the surface layer and it appeared that the dimensions of the trench were not wide enough to include the full size of the walls. An extension was added to the trench and its new size became 8 x 7.30 m. Three walls appeared and it was assumed that two of them were part of a room, the fourth wall of which was still to be uncovered. The eastern wall of the room was discovered in the 1986 excavations and located in trench (I22) (see fig. 2). The wall was built with medium size sandstone blocks (50 x 30 cm) although some smaller stones were found (26 x 15 cm). The stones were laid in two rows in the upper part of the wall and spaces between them were filled with mortar and small sized stones. Some of the stones were in very bad shape and damaged (fig. 5). Two courses can be clearly seen on the eastern side of the wall, about 30 cm high. It should be noted that the courses are not completely straight.

¹ Al-Ibrahim and Al-Talhi 1989.

² Al-Talhi 2002.

The second wall, which is the northern one, 70002), is connected to the eastern wall at a right angle and is oriented from west to east. It is built with undressed sandstones varying in size and shape. It is about 6.40 m long and 0.76 m wide. In the middle of the wall, at about 2.95 m from the northwest corner, there is a slight decrease in its height (fig. 6) which extends for 2 meters. It may be for a door but there is no clear threshold. It may also be the result of some fallen stones. The upper course is built with sandstone pieces of various sizes. The average of the biggest stones is 40 x 27 cm and of the smallest is 18 x 18 cm. This wall appeared at a height of 780.45 m and slopes at a slight angle from west to east (0.66 cm).

The third wall, which is the southern one, wall 70007, is connected to the eastern wall at a right angle. This wall extends from southwest to southeast and parallel to wall (70002). It is about 6.8 m long and 0.60 m wide and built with undressed sandstone. The stones vary in size and their average dimensions are 70 x 22 cm. Spaces between the stones are filled with mud mortar and small stones. In general, the stones are white but there are some yellow and red stones as well. At the end of the wall, near the eastern baulk, stones are smaller in size. At about 1.80 m from the southwest corner, a few mudbrick pieces appeared (fig. 7). They extend for about 1.30 m. Seven pieces can be clearly seen, four of which are stretchers while the rest are headers (40 x 22 cm). They are badly eroded and are only 4 cm thick. Beyond these pieces, no bricks can be clearly seen, there is only a hard piece of mud, which extends for about 50 cm. The discovery of the mudbricks indicate that the walls were built of stones in their lower part and that their upper parts was built of mudbricks. If one compares the walls uncovered in 2009 with the ones from the neighbouring room, which was discovered in the previous excavation (room 7), one can assume that the new walls belong to a rectangular room of about 4 x 12 m.

No clear floor was discovered for this new room and the work stopped at a depth of 778.96 m, where a hard brown soil appeared (*locus* 70009). This soil spreads between walls 70002 and 70007. The original floor for this room may be at a higher level than the base of the current walls.

At the same level (778.96 m), near wall 70002, various small stones appeared (*locus* 70010) (fig. 8). They were placed in a semi circular shape, 0.30 m in diameter. The average size of the stones is 12 x 16 cm. They may have formed a column base.

At level 778.86 m, three stones (*locus* 70011) appeared (fig. 9). They are well dressed stones, the largest of which is 23 x 84 cm, and they may form a threshold. Similar stones were seen in the adjoining room no. 7 from the previous excavation (see fig. 2).

Almost in the centre of the trench, a layer of ash (*locus* 70008) was located at 780.26 m. It is about 10 cm thick. Almost at the same level, in the northwest of the trench (*locus* 70006), a dark grey soil with some traces of burning and a few pottery sherds was located. It is about 80 cm long and 50 cm wide.

At 780.25 m, a layer of brown mud soil lies in the northern part of the trench as well as in some parts of the eastern trench. It contained no finds. It is about 1.45 m long and 0.90 m wide (*locus*

70005). At level 780.43 m, almost to the east of the trench, a very soft soil, dark in colour with traces of ash, was located (*locus* 70004). To the northwest of the trench, at 780.40 m, a very soft dark soil without finds was located. It spreads over an area of 80 x 140 cm (*locus* 70003).

The top surface layer (*locus* 70001), which is a dark brown soil, spreads all over the trench and was located at level 780.85 m. Pottery sherds were found in this layer.

It should be noted that pottery sherds occurred in small quantities in this trench. No complete vessels were found and most of the pieces were body sherds.

In *locus* 70009, at level 778.96 m, some interesting pieces were identified by C. Durand and Y. Gerber.

- 70009_P01: the handle of an amphora, oval in section, of a light red paste, which may be imported. Its origin is not known;
- 70009_P04 : the rim of a jar with an inverted neck, horizontally everted, a grooved rim and thinned lip, which may be Byzantine;
- 70009_P05: a rim sherd from a cooking pot with a bevelled rim. It may be dated to the 3rd century AD and is possibly imported from Petra.

In *locus* 70004, at level 780.43 m, some interesting pieces were found:

- 70004_P02: the rim of a jar with a long inverted neck, horizontally everted rim and thinned lip, of light red paste, well fired, which may be Byzantine.

From the upper surface of the trench, *locus* 70001(780.85 m), a few pottery sherds were selected for recording:

- 70001_P01: body sherd, ribbed in its interior with green glaze, probably Parthian (1st AD);
- 70001_P03: the rim of a jar without curving rim and rounded lip, which may be late Hellenistic .

Bibliography

Al-Ibrahim and Al-Talhi 1989: Al-Ibrahim M. and Al-Talhi D., "A Preliminary Report on the Excavation at Al-Hijr (Second Season)", *Atlat* 12, p. 21-28, plates 11-22 and Arabic version p. 25-33.

Al-Talhi 2002: Al-Talhi D., "Namûdhaj li-l-maskan al-nabatî min Madâ'in Sâlih", *Adumatu* 10, p. 35-48.



Fig. 1. Location of Area 7

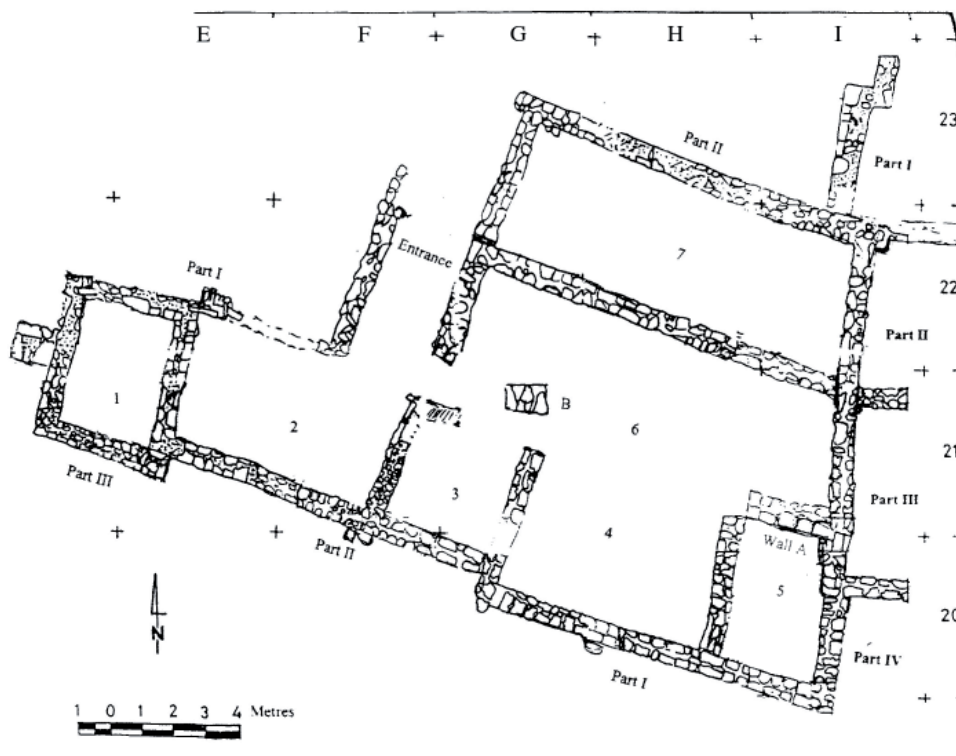


Fig. 2. Plan of the residential unit excavated in 1980 (from D. al-Talhi, *Mada'in Salih, a Nabataean Town in North West Arabia: Analysis and Interpretation of the Excavation 1986-1990*, PhD Thesis, Department of Archaeology, University of Southampton, 2000, p. 234, fig. 33)

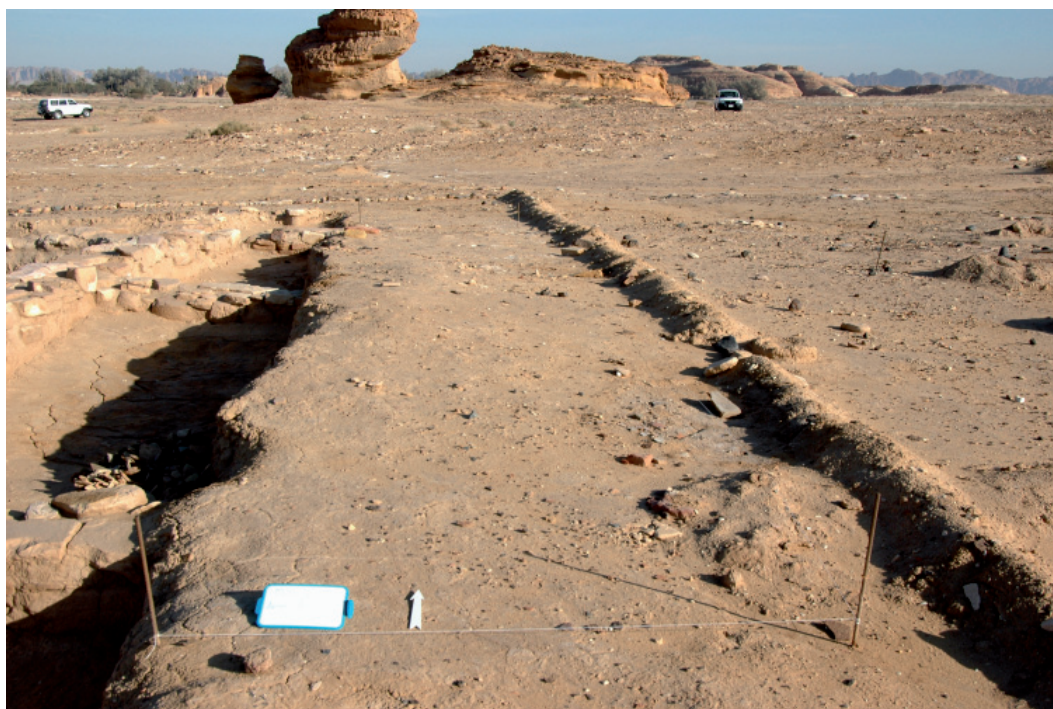
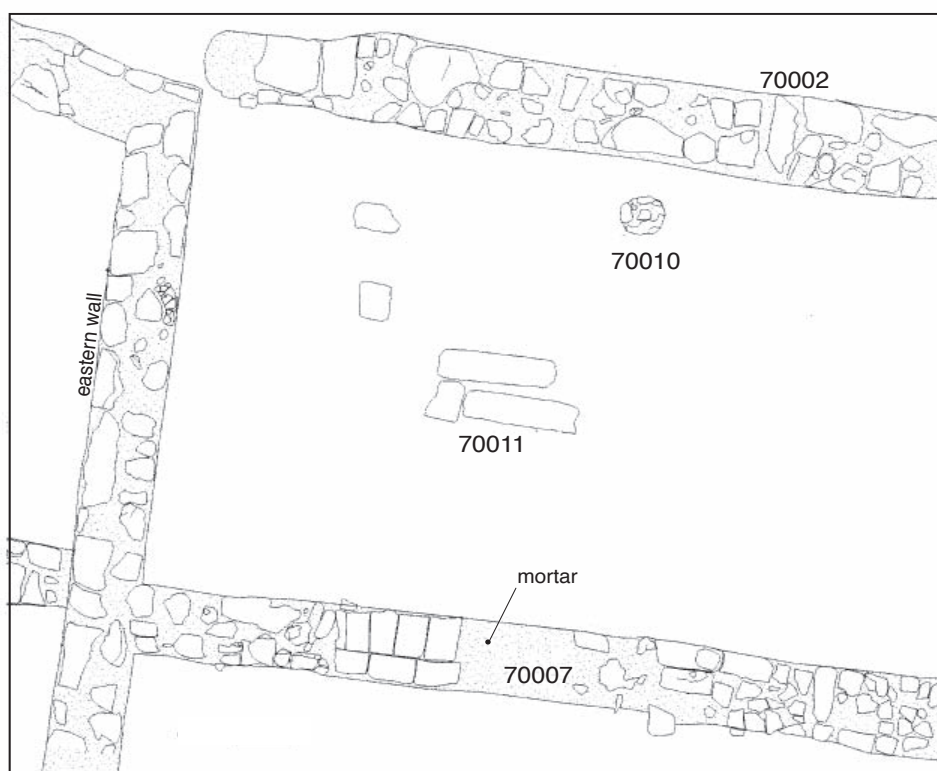


Fig. 3. Trench A before excavation



© Mission archéologique de Madâ'in Sâlih
Relevé et mise au net M. Al-Soli 2009



Fig. 4. Provisional plan of Area 7 at the end of the 2009 season

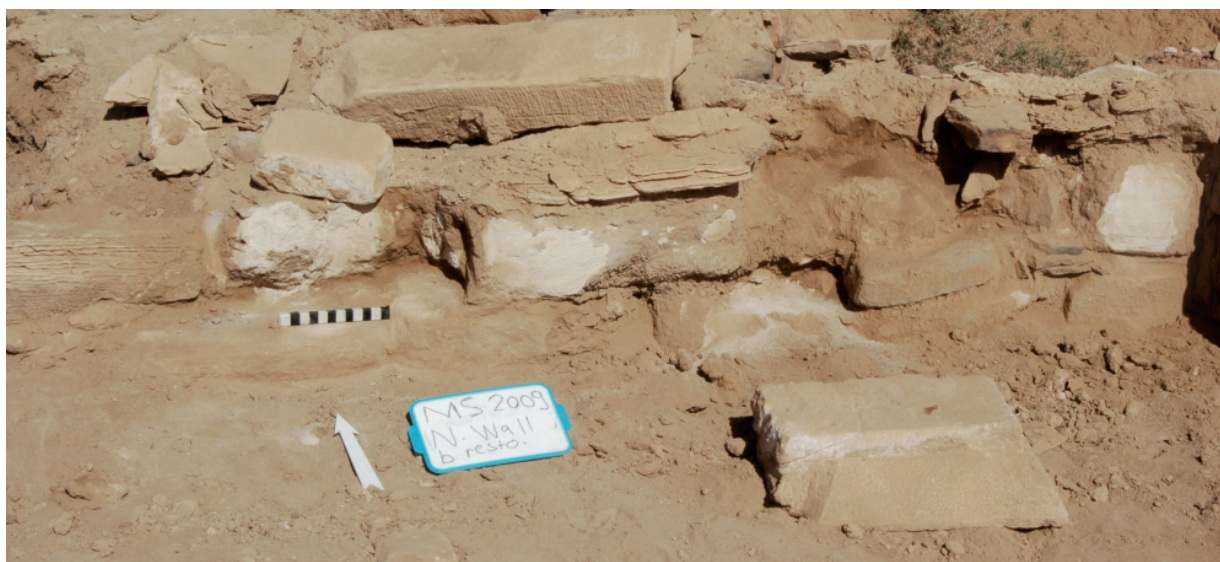


Fig. 5. Damaged stones in some walls of the unit

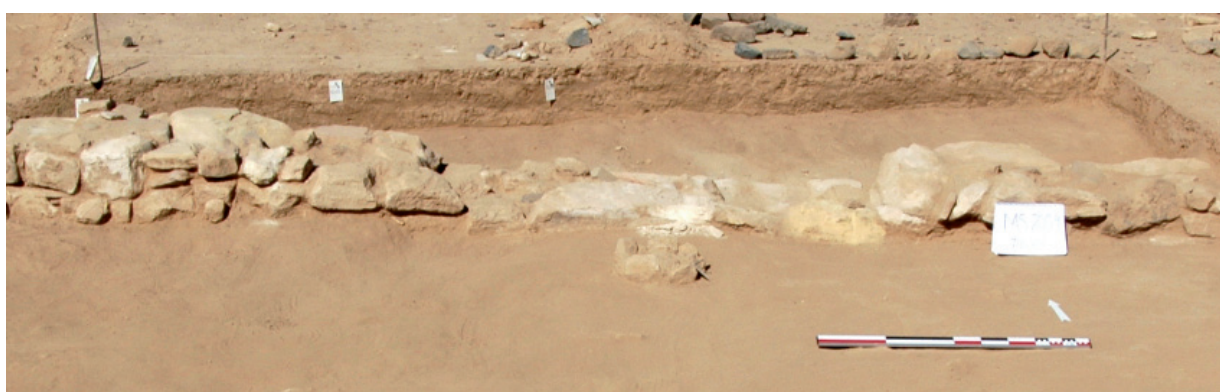


Fig. 6. Slight decrease in wall 70002

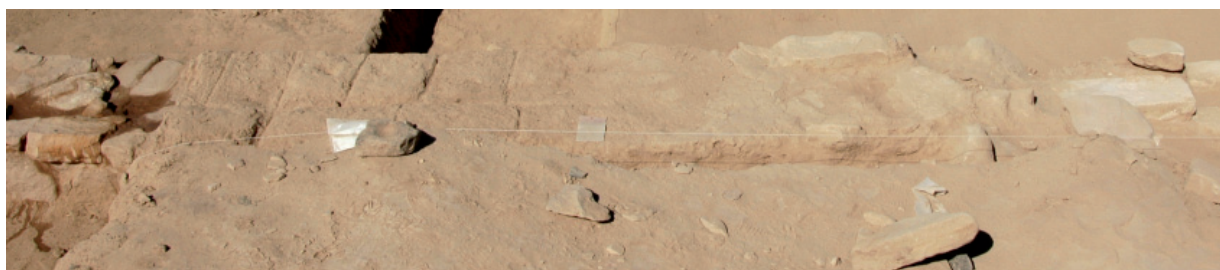


Fig. 7. Mudbrick pieces in wall 70002



Fig. 8. Locus 70010



Fig. 9. Locus 70011

Area 8 (80000)

Residential Area, Area 8

Solène Marion de Procé

Choice of Area 8 and environment

During the 2008 excavation season, F. Villeneuve had noticed in the residential area, showing on the surface, three column drums (0.70 m diameter) as well as a long sandstone block (fig. 1) (approximately 2.50 m x 0.50 m).¹ Middle sized stones visible at about 1 m north of one of the column drums appeared to form a corner. On the geophysical image, in square 30 (fig. 2), one could also possibly see the corner of a large structure, \pm 30 m x 30 m. This structure is located at the extreme southeast corner of the geophysical survey carried out by A. Kermorvant in 2002, not far from the 1980 excavations at the foot of IGN 32 (fig. 3). The general condition of the sandstone visible on the surface of the area is very eroded and washed due to the presence of a small wâdî running to the southwest and to the fact that important quantities of salt rose to the surface all over the site over the last year. The salt damages the fragile sandstone when a crust forms over the blocks. There is a general slope from north to south in the western trench and from west to east in the northern trench. Small sections of walls visible on the surface led us to think that the area had been badly eroded and that all the possible elevation of mudbrick walls had been washed off. In addition, because elsewhere in the residential area stone courses are foundation courses, we first thought that we were confronted with a heavily damaged structure of which only remained a couple of foundation courses. The presence of the column drums and of one large block, in addition to traces of stone courses belonging to a couple of walls, convinced us that it was worth carrying out an exploratory excavation in this area. The possibility of finding a structure which reused architectural blocks was not excluded ; in the 1980 excavations by D. al-Talhi, such blocks were reused in the constructions.

It was thus decided with F. Villeneuve, L. Nehmé and D. al-Talhi to adopt an extensive excavation strategy, giving priority to drawing the plan of the building and trying to collect datable material in through soundings.

1. See the report on the 2008 season, p. 16.

Journal of excavation

Excavation in Area 8 started on the 27th of January 2009 by a general scraping of the corner made by the sandstone walls. With only one workman, we followed the course of each wall (north-south: 80002 ; east-west: 80001) (fig. 4). Most of the stones uncovered were eroded and sometimes reduced to a large spot of powder. The walls are built mostly with relatively large sandstones blocks, some of which are reused architectural blocks (fig. 5). There are also small blocks and one half of a basalt (?) millstone. Over the walls and beside them, following the slope of the ground, are large areas of melted mudbrick and clayish material (fig. 6) which indicate that the walls were originally covered with a mudbrick elevation, as we would expect in Madâ'in Sâlih. As excavation progressed, we got more workmen to work in our area and by the end of the three weeks of excavation, five workmen were working daily in Area 8 (fig. 7). In the last few days, two more workmen applied some *mûna* over the unearthed structures in order to preserve them. The bench mark for the altitude was the same as in Area 2, i.e. 778.56 m above sea level. 41 *locus* sheets were filled (mostly walls and structures) and 71 objects were collected (27 metal pieces, 18 coins, stone fragments, pottery, shells...).

We excavated an L-shaped area, following the axis of walls 80001 and 80002, uncovering a 174 m² surface. We shall first present the northern square (north-south axis), followed by the western one (east-west axis).

Northern Trench

In this part of Area 8, we excavated a *c* 3.10 m large area, following north-south wall 80002 (0.60 m wide). In order to discover possible walls perpendicular to 80002, we decided to excavate a strip of 1.60 m to the west of the wall and one of 0.60 m to the east. As we progressed towards the north, we unearthed three sandstones blocks aligned on an axis perpendicular to 80002 but located 0.60 m to the west. A few centimetres to the north, a couple of mudbricks appeared on the surface, and a few centimetres further north, a few stones formed more or less a circle (80007) joined by hardened clay (figs 8 and 9). They are probably a junk pit because they were associated with a lot of ashes and burnt material (pottery, fauna, wood and organic material). A sounding was undertaken in this area in order to see what was underneath 80007. We also wanted to find out more about a wall which is perpendicular to 80002. Wall 80008 is chained with 80002. The course of wall 80008 shifts to the north *c.* 0.80 m from 80002. 0.70 m to the north of 80008, we lost track of wall 80002 but we discovered another wall (80018) going north-south parallel to 80002 but slightly to the west (30 cm) (fig. 10.. The couple of mudbricks we observed on top of the stone course indicate that the elevation of the wall was made of mudbricks. It appears therefore that in the northern part of the trench, there was a different space defined by 80018 to the east and 80008 to the south. Sounding C covered the whole width of the northern trench, cutting through 80007 and including 80008. This sounding confirmed that 80007 was a junk pit with the material mentioned above. To the east of the pit, there was a layer of clayish earth abutting both 80002 and 80008. To the east of 80002, we found

some sherds but nothing diagnostic and no clear occupation floor. As for 80007, we found very large spots of grey ashes under some clayish earth abutting wall 80008. 80007 turned out to be wider and deeper than expected. Under the burnt pottery and the fauna remains, mentioned above, there were large layers of ashes spreading up to 80008. In the course of the excavation, we discovered a few sherds to the west of 80002, and managed, so it seems, to reach its base. Below 80007 and the layers of ashes, a sandstone block was standing in the baulk (778.58 m), 20 cm of which were protruding, and a second block flanked it on its southern side. A little deeper, there were large flat stones which looked very much like a pavement (80029, 1.60 m north-south and 0.90 m east-west) which abuts wall 80008 but does not reach wall 80002 since it stops approximately at the point where the course of 80008 shifts to the north. The pavement itself is not made of well-cut stones (the carving marks can still be seen on the edges). It is also interesting to notice that two out of the four blocks which composed the pavement were in fact the same block cut in half in the length (see fig. 10). As the pavement abutted 80008 to the north, we uncovered sandstones blocks aligned but not so much looking like a wall. It is poorly preserved and stopped approximately where the pavement stopped. We allow ourselves to think that we are in the presence of a wall (which would echo the western part of 80008) not only because of its alignment and position but also because it is located immediately under the couple of mudbricks we mentioned earlier.

As we continued excavation to the north, we discovered the top of a water basin (0.50 m diameter) and decided to dig a sounding in order to find out more about wall 80002 and to find the base of the water basin because it may be associated with an occupation floor (sounding A). We excavated about 0.35 m of earth without finding any floor or diagnostic pottery sherds and discovered that wall 80002 did not continue. Instead, we found north-south wall 80018, mentioned above, its eastern face located 0.50 m west of 80002's eastern face. Note that wall 80002's southern face is missing at the edge of what has been preserved. The levelling of 80018 seems to be at the same level as what seemed to be a floor, 80017, which was probably used with water drum 80016, which proved to be bottomless. It is not an absolutely clear floor but there are some large pieces of fauna and broken flat sherds in it.

Water drum 80016 was standing close to 80018 and it had certainly been used in this position, as shown by the stones which were placed underneath it to fill the breaks of the basin (fig. 11). Against the basin, we found a complete lamp possibly dated to the 2nd century AD (fig. 12). The northern part of Area 8 was excavated deeper than the rest of the area : we reached the bottom of the water basin that was at a height of 778.43 m.

Western trench

We adopted the same excavation method for this trench. It is larger than the northern one, *c.* 8.80 m north-south and *c.* 15.30 m east-west (see figs 1 and 4). We followed the course of the east-west wall 80001 (0.60 m wide and apparently 13 m long). North of it, we believe that we are in the interior of a structure delimited by 80001 and 80002, but as we excavated 20 cm

deep on each side of the wall for 13 m to the west, we found no north-south wall which would indicate internal partition and did not find any occupation floor either. Wall 80001 stops after 13 m and it seems as if there is a 1.50 m section of mudbricks near its western extremity. We believe that there is either a large room there or that some hypothetical walls would have been completely destroyed. To the north of the extremity of 80001, there was a group of fallen blocks (80006) (the stones were 0.20 m wide at most) which seemed to come from a structure immediately north of the wall. We cleared them and found nothing below them (fig. 13).

To the south of 80001, there was a layer of varying thickness (maximum five centimetres) of hardened clay which followed the field's north-south slope (as we mentioned earlier, fig. 6). It looks as if the mudbrick elevation of 80001 has melted on its southern side. We did not excavate this layer of hardened clay this year because it protects the lower layers for future excavation. In some places however, we found that under it, there were some ashes and burnt material. Just south of the corner formed by 80001 and 80002 was the first column drum we noticed and the best preserved one. As it slid slightly to the east, we were able to see the trace it left in the layer of clay (fig. 14). *C.* 3 m south of 80001, we found a wall parallel to it, 80004, and later discovered that it formed a corner with 80002 and that it was therefore part of a larger structure. A section of 5 m of this wall only is preserved. As we continued to scrape the surface, we discovered that the column drums which emerged on the surface were aligned in an east-west axis and seemed to be built in the continuity of 80004 but slightly south of it. Along with long sandstone blocks, they formed a feature (should we call it a wall?) thus made of six drums and three sandstone blocks, including the 2.70 m long block that we numbered 80005. The others measure 0.70 m (between two drums) while another one measures 1.60 m and gives the impression of a passage. The long sandstone block we mentioned above, perpendicular to the general east-west axis, 2.70 m long and 0.50 m wide, is also part of the structure (see figs 4 and 15). The "passage" formed by the 1.60 m long block is "echoed" in wall 80001. Indeed, two blocks (0.60 m long) placed as headers in the wall 80001 distant of *c.* 1.27 m from one another appear to be in front of this "passage" in 80005 (fig. 16). Wall 80001 is made of reused architectural blocks of various sizes and shapes but the overall impression is that it is well-built and well preserved. Between the two headers of 80001, however, the stones are much less well organised and look as if they had fallen. This is another argument for supposing that it may have been a passageway, to be related to the passage in structure 80005 (see fig. 5).

The western extremity of this trench was very washed away and a few features only are preserved. The small *wâdî* running north-south in this area may explain why wall 80001 stops there. A north-south wall (80011) in the south of the trench, cannot be associated with any other feature in the area. It is poorly preserved, a couple of courses at most, and stones are very eroded, especially the sandstone blocks. Between structure 80005 and wall 80001, we found no wall, only some mudbrick material and a few medium-size blocks which did not seem to be part of a wall.

We decided to make a sounding (sounding B) near one of the column drums in order to determine how deep this structure was and see how thick the drums were. The chosen spot was the western drum. We defined a 0.50 x 0.50 m area abutting the southwest quarter of the drum. Under the clayish surface (*locus* 80019), we found a thin layer of ashes followed by a thick layer of earth. Finally, there was another layer of earth which contained a lot of white inclusions. All these layers yielded sherds, some of which could be assembled although there was no complete form. All three layers seemed to date back to the same period, as suggested by C. Durand and Y. Gerber. We also discovered a sandstone block which seemed to be relatively large but its eastern face is still unexcavated. We decided to extend the initial sounding to the south down to the southern baulk as well as to the west for another 0.50 m so that more information is gathered on wall 80011. The sandstone block is 0.70 m wide and *c.* 0.12 m thick (fig. 17). South of it, we found a similar block, of similar size, as eroded as the first one. They seem to be laid on the floor, at the same level as that of the column drum. The latter proved to be 0.40 m high. Wall 80011 is as poorly preserved in section as it is on the surface: it is made of reused blocks, some of which are relatively large, but perhaps due to the wâdî running north-south, it does not seem to be as well built as the other walls of the area.

On the northeastern side of the trench, as we were scraping the surface north of 80001, we found a (basalt ?) stone emerging from the surface. We decided to undertake a small sounding (sounding D, see fig. 18) in the area to try and see how deep wall 80001 was founded and check whether there would be any floors associated with it. Sounding D covered the area between the northern baulk and wall 80001 (1.60 m) and was 1 m wide. As we went down, we found no clear occupation floor but the piece of basalt turned out to be a long oval element, 46 cm high and 40 cm large, with a 10 x 8 cm orifice and two little symmetrical bumps on the exterior used as handles. There were stones lying flat next to it, what looked like one or two mudbricks, a spot of ashes in the southwestern corner which may be part of a floor, 40 cm under the surface (778.34 m). The second course of wall 80001 appeared but we lacked time to go deeper. We therefore know that 80001 has a second course running under the surface but we do not know yet if it is the last one.

The last occupation of the area: abandonment or destruction ?

For the moment, the last phase of occupation of the structure cannot be dated precisely, but pottery study by Y. Gerber and C. Durand showed that most of the sherds collected in Area 8 are dated from the Late Roman period to the late Byzantine period. Since we did not reach deeper levels and found no clear occupation floors, almost none of the sherds were *in situ* and they were mixed, making it very difficult to date the *loci* to which they belonged.

As elsewhere on the site, no elevation is preserved in Area 8, and it does not seem that the walls have kept several courses. The reasons for the abandonment of the building are not clear but we found interesting features in the southeast corner of the trench. Below the loose sand of the surface, there was a layer of hardened mud and clay with impressed shapes in it, looking like

rain water puddles, stones and traces of stones that have been dragged following the orientation of the small wâdî (fig. 19). There are also a couple of long prints which are intriguing. They are about 0.20 m wide and more or less 0.20 m deep. These may be either recent tire tracks or the traces left in the mud by a fallen palm tree trunk which may have been used as a beam. The fact that a few stones around it were left in the mud whereas there seems to be nothing left of what made the larger print, may indicate that the object which made them was in wood. Either it disappeared over the years or, more likely, it was reused immediately after it fell. It may also have been anything that was dragged by the rainwater in the wâdî. We may ask whether these prints are evidence of the building having collapsed, in which case most of the fallen material would then have been reused elsewhere. Whatever the case is, it does not seem to have been a brutal destruction such as fire or intentional destruction and the lack of *in situ* material on the surface is also an argument in favour of the hypothesis that the building went out of use for some reason (why not frequent collapse of some areas in the building due to the wâdî for example) and was gradually abandoned.

First remarks on the chronology in Area 8

As we mentioned earlier, the pottery collected does not allow for a precise dating for any of the *loci*. As we explained above, we did not excavate very deeply but uncovered a large surface so as to try and establish a top plan of the building. As for the chronology of Area 8, pottery indicates that the last period of occupation must have occurred during the Late Byzantine period, but this does not date the building itself. No clear occupation floors were found and the walls must therefore have been used before this period. 18 coins were found during this season, some of which too damaged to be read. Given the number of reused blocks in the walls, there surely has been an original – undatable – building phase with monumental architectural blocks. Below are some extra remarks on the chronology of the area.

First, walls 80001, 80002 and 80004 were probably built together and were part of a building. We can suppose that it was made of stones which were already around that area. Neither of them has a clear perpendicular wall, except for wall 80008 which appears to have witnessed several phases of construction, Feature 80007 was abutting it and pavement 80029 seems to have been built at the same time. The axis of the wall is moving slightly to the south from the eastern limit of 80002 (fig. 20). It joins wall 80002 and the western face of the latter stops at that point. Wall 80018 is chained with 80008's eastern part on its northern face. There is a gap between 80002 and 80018 and a few blocks have been thrown in it (fig. 21). The chronology of this area is difficult to understand. We thought that we may have several phases of the structure represented in the trench. There would be one earlier phase of the building bordered by 80018 and the western part of 80008, with an entrance preceded by pavement 80029 the boundaries of which being 80008 to the north and 80039 (?) to the south. Supposedly, wall 80002 would have been built later, along with

a larger building, and the entrance would have been moved from the east to the south but the fact that wall 80002 continues for another *c.* 50 cm after crossing paths with 80008 instead of forming a corner with it, is an argument against this hypothesis.

Perspectives

After one excavation season, Area 8 is promising because it shows structures which are different from those found in the other areas (except for D. al-Talhi's 1980 excavations). However, the excavations raise many questions:

- are there occupation floors below the crust of hard clay the south of 80001? Or was were they all washed away?
- what are the two blocks found in sounding B? Could they be monumental architectural remains belonging to a previous phase?
- how deep the walls are founded? Are there just a couple of courses preserved as we assume from what we saw in sounding C?
- are there structures belonging to a previous phase below what was uncovered in 2009?
- in the northern trench, is there a threshold to the west of pavement 80029? And is it really the interior of a structure? Is it possible to determine whether it was roofed or whether it was covered a large open area (which would explain the absence of partition walls)?

Generally for this trench, it would be useful to see what is west of it, hoping, since it is the higher spot in Area 8, that it will be less washed away than the rest of the area.

We also have to think of our strategy for the next season. Shall will we have an extensive approach like this year or rethink our method for the second season? It may be better to try to collect diagnostic material and make deeper soundings. In this respect, the areas located west of 80002 and north of 80001 seem to be the most appropriate ones.



Fig. 1. Surface of Area 8 before excavation (photo F. Villeneuve)

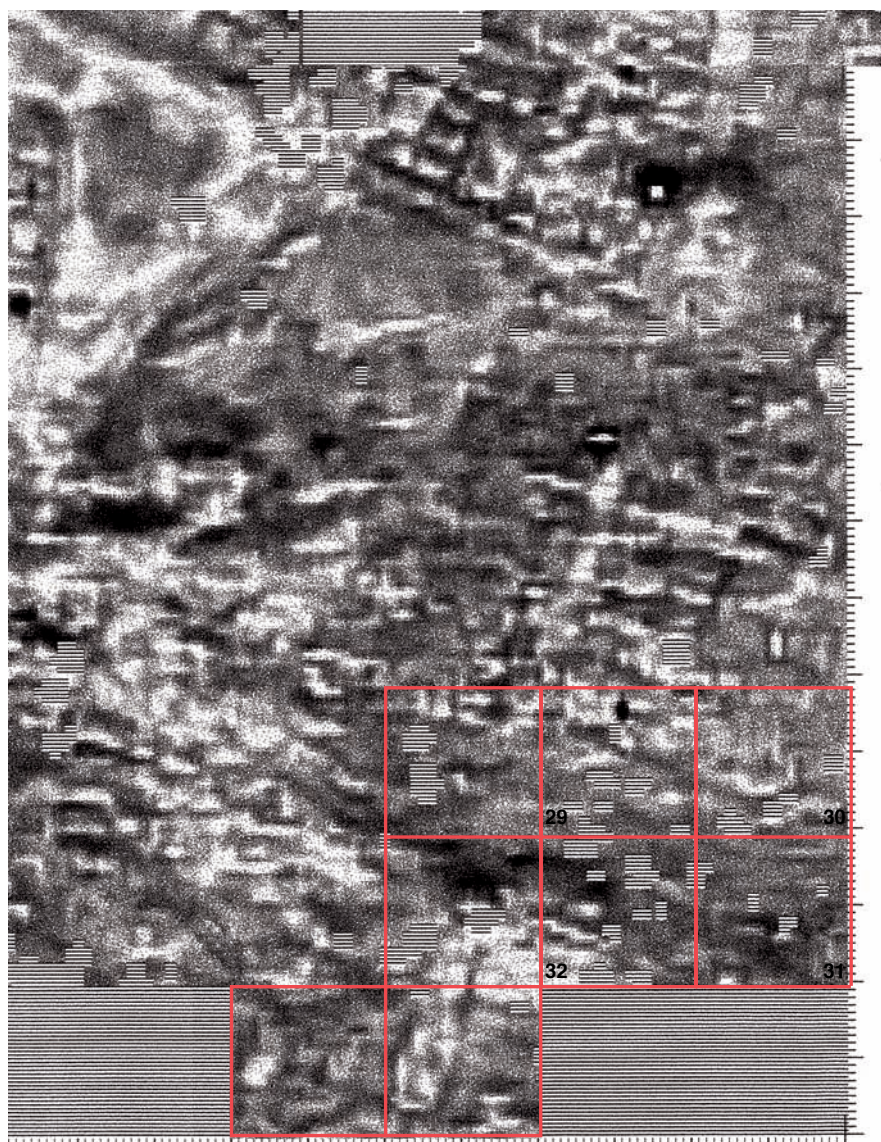
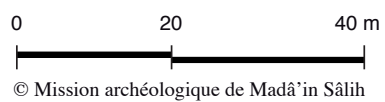


Fig. 2. Geophysical image Area 8



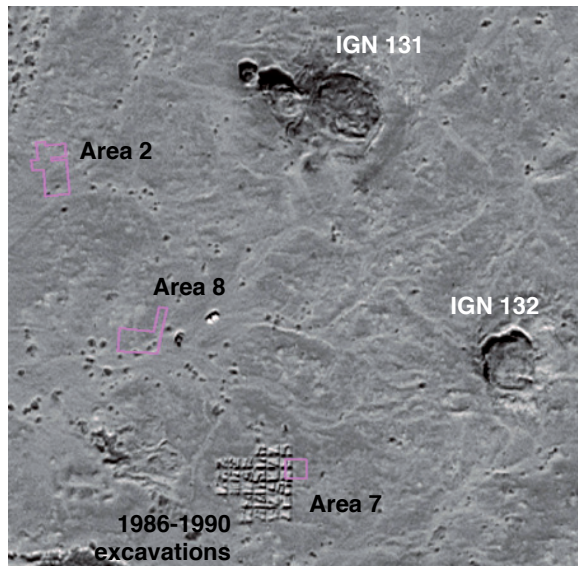


Fig. 3. Location of Area 8



Fig. 5. Western trench, large block reused and eroded, from the north

Fig 4. General plan (see A3 at the end of the report)



Fig. 6. Western trench, large area with melted mudbrick and melted clay, from the west



Fig. 7. Workmen in Area 8



Fig. 8. Structure 80007 with three stones beside it, from the west

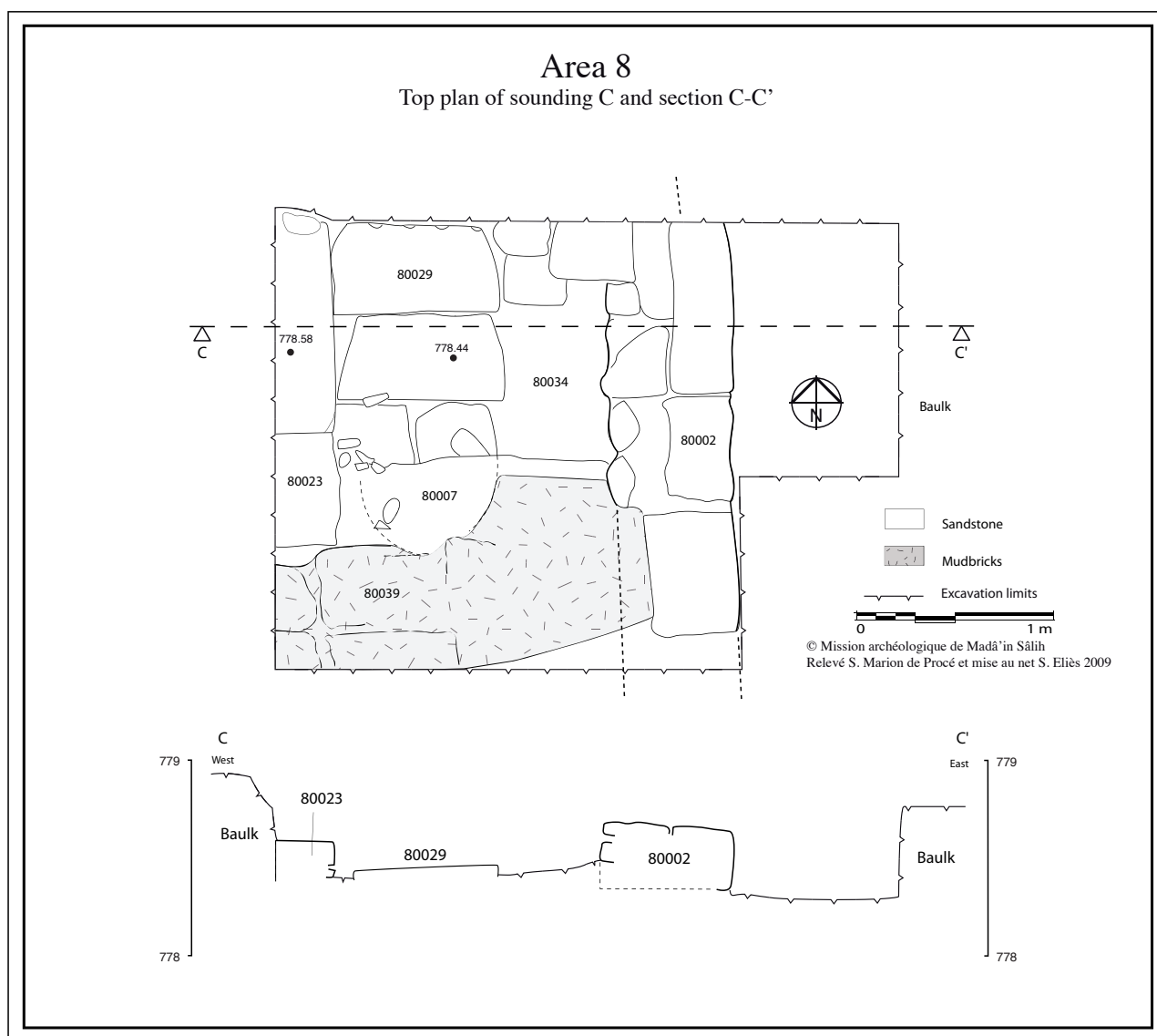


Fig. 9. Top plan of sounding C



Fig 10. Part of northern trench, from above. Wall 80008 is in the center and wall 80018 is on the left



Fig 11. Northern trench, water basin 80016



Fig. 12. Lamp found near water basin 80016

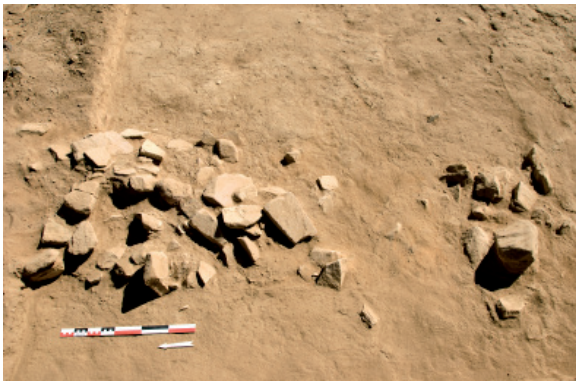


Fig. 13. Feature 80006



Fig 14. Former location of column drum impressed in hardened cla



Fig 15. General view of western trench from the north. On the right, column drums of structure 80005 and “passage” in wall 80001



Fig. 16. Closer view of the "passage" in wall 80001 and structure 80005 from the north



Fig. 17. Large block found in sounding B

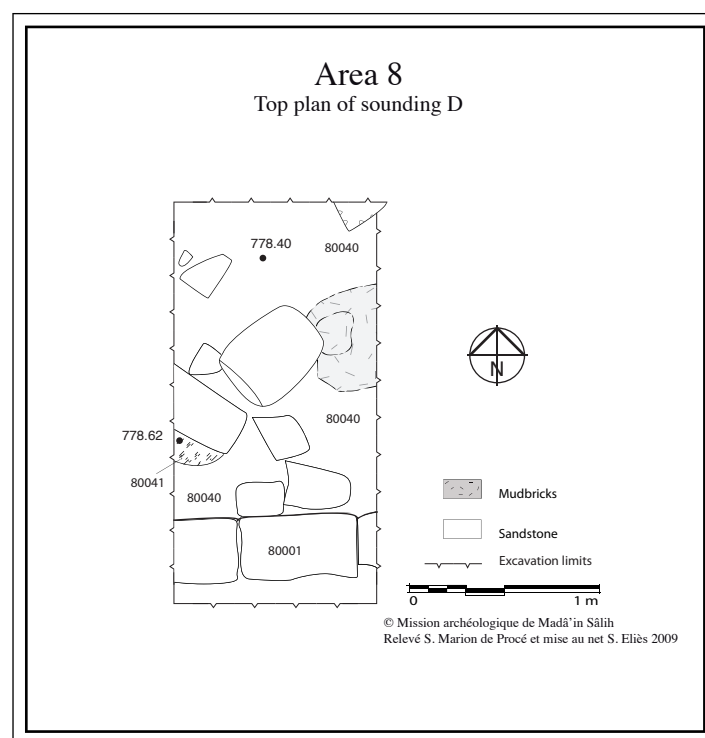


Fig. 18. Top plan of sounding D



Fig. 19. General view of southeast corner of Area 8, with mudbricks and hardened clay



Fig. 20. View of 80008 (on the right), from the east



Fig. 21. View of the gap between 80002 (on the top) and 80018 (on the left). 80008 is on the bottom right filled with small blocks, from the east

Monumental Tombs, Area 5

Monumental Tombs, Area 5

Nathalie Delhopital and Isabelle Sachet

1. Introduction: history of the excavation

In 2008, Nathalie Delhopital, an anthropologist and PhD student at the University of Bordeaux 1, and Isabelle Sachet, an archaeologist and post-doctoral researcher at the UMR 7044 in Strasbourg began work on the tombs of Madâ'in Sâlih. Along with the soundings in the residential area and the sanctuaries, it was important to try to determine the length of occupation of the necropolese and their degree of contemporaneity with the settlement.

Results from the 2008 excavations showed that the large tombs of Madâ'in Sâlih, which had been thought to be empty, in fact still contained some remains of Nabataean burials. They have been heavily disturbed and reworked, especially tomb IGN 20, but it was still possible to study them and the work produced a lot of archaeological material: bones, textiles, leather, wood, pottery, glass etc.

The principle question being asked was this: did the occupation of the monumental tombs date only to the Nabataean period or could several layers of occupation be distinguished inside the burial chambers?

There are thirty-one inscriptions engraved on the tomb façades, dating their construction to the period between 1 BC and AD 75. Observations of the tombs made by Jean-Pierre Braun have shown that there was at least one construction phase prior to that of the façade tombs with doorways;¹ it is characterised by burial chambers, without decorated façades, accessed through an opening high up in the cliff.

In 2008, one burial chamber of this type, IGN 125 (fig. 1), was excavated in order to establish a chronology for these older tombs. The study of this tomb was disappointing because the interior had been emptied of its content in antiquity. Only a single pot sherd, dated to the second half of the 1st century AD, and a few human bones, were found, leaving the question of the date of

¹ See the 2004 project report: Augé, Bernard, Dal-Prà *et al.* 2007 (in press).

these older tombs unanswered. It would, therefore, be useful to try to excavate another such monument, for example in the Qasr as-Sâni' massif, which lies further away from the urban centre and so is relatively more protected from the curiosity of ancient and modern visitors.

However, excavation of tombs IGN 20 (in 2008) and IGN 117 (begun in 2008 and continued in 2009), has produced some new chronological evidence and a better general understanding of the history of occupation of the tombs and of the burial practices current in antiquity.

2. Results from tomb IGN 20

Tomb IGN 20 is the largest finished tomb in the town of Hegra (fig.2). Cut into the massif of Qasr al-Bint, it faces the ancient town. This tomb belonged to the strategos Shullay, who was active during the reign of a king named Malichos. The funerary inscription, engraved above the entrance, is partly worn away but the king mentioned is most probably Malichos II (AD 40–70) and not Malichos I (60–30 BC). Indeed, all the other monumental tombs on the site are dated to the 1st century AD and none appear to have been built in the 1st century BC.

During the ceramic survey, undertaken in 2004 by Yvonne Gerber and Isabelle Sachet, a large amount of ancient textile and leather was collected from the surface in tomb IGN 20. Tomb IGN 20 is highly visible and for the last twenty years had been easily accessible as long as the metal steps, put up by the Department of Antiquities, which led up to the terrace in front of the tomb, had remained in place. The main aim of the excavation carried out in 2008 was to recover any archaeological material overlooked by the succession of tomb robbers. This involved many visits and the material recovered in the pit tombs of the tomb had been very disturbed and was badly fragmented. The dates of the disturbances are unknown, but they must have been recurrent since the abandonment of the site. The building of the Hijâz railway by the Ottomans was, for example, a period when there was much movement of people and antiquities, a fact illustrated by a sundial discovered in Madâ'in Sâlih which is now preserved in the Museum of the Ancient Orient in Istanbul.² However, it is certainly a case of visits, because the tombs of Madâ'in Sâlih have, basically, never been reoccupied, except on rare occasions, nor did they systematically serve as dwellings or stables, unlike Petra those of where the local bedouins made much use of the funerary monuments. This absence of reoccupation allowed the archaeologists to recover numerous objects attesting to significant funerary activity in ancient Hegra.

To our great surprise, an almost intact primary burial (*locus* 50068) was found in pit tomb IGN20SF1, along the southern side wall of the chamber (fig. 3). This was the burial of a woman, between 20 and 30 years old, 1.59 m tall, whose bones are well preserved. Her body was wrapped in leather and in red cloth woven with bands bearing a pattern of Greek inspiration (fig. 4), similar to Coptic cloth.³ The motifs found on the leather associated with this burial

² Healey 1989.

³ For a similar motif on Coptic cloth dated to the 8th century AD, see the edges of a stip of linen and wool tapestry in the Louvre Museum, inventory no. E 9964.

are comparable to Coptic funerary breast-plates, according to the leather conservator, Céline Bonnot-Diconne. They differ, in any case, from the motifs found on other leather from tomb IGN 20.⁴ The radiocarbon analysis of bones from this burial provided the later of the two dates from this tomb (see Appendix 1): 1845 ± 25 BP, which is 90–101 cal AD to 124–236 cal AD (at 2 sigma 95 %), or 131–179 to 189–213 (at 1 sigma 68 %). Thus, burial 50086 could well date to the period between the second quarter of the 2nd century AD and the first half of the 3rd century AD, whereas the other burials in the tomb would be older. In fact, the archaeological material found in IGN 20, particularly the pottery, belongs rather to the 1st and beginning of the 2nd century AD.⁵ In addition, the second radiocarbon date from tomb IGN 20, using a bone taken from the bottom of pit tomb SF8, predates the bones from burial 50086 by more than a century in terms of absolute dating: 1920 ± 25 BP, which is 28–40 cal AD to 50–129 cal AD (at 2 sigma 95 %).

The quality and variety of objects present in the tomb would seem to indicate that the individuals buried in IGN 20 had access to a number of choice objects, some of them imported, as attested by two boxwood combs⁶ and imported glass objects.⁷ This is hardly surprising in so far as the individuals buried there belonged to the family of Shullay, a strategos who, given that his tomb was built in Hegra, had probably been governor of this town during the reign of Malichos II.

3. Tomb IGN 117

3.1. Description

Tomb IGN 117 (figs 1 and 5) had been chosen, in 2008, by Isabelle Sachet and Nathalie Delhopital for its archaeological potential: two of the slabs that closed the door were still *in situ* and the burial chamber was filled with sand for over a metre above the level of the threshold. Also, the ceiling of the chamber was intact and did not show any signs of infiltration. There was, therefore, a good chance that any archaeological levels preserved inside might be in good condition.

Tomb IGN 117 is a small tomb with two rows of crowsteps, cut in the eastern face of Jabal al-Ahmar, in the southern part of the site. The chamber measures 4.50 x 5 m and the door faces east. A cartouche, carved above the doorway, carries the following inscription, dated to AD 60/61 (JSNab 26):

“This is the tomb which Hīnat daughter of Wahbū made for herself and for her children and her descendants for ever. And no-one has the right to sell it or give it in pledge or write for this tomb a lease. And whoever does other than this, his share will revert to his legitimate heir. In the twenty-first year of King Maliku, King of the Nabataeans” (translation after Healey 1993: 187).

⁴ Rapport 2009 de C. Bonnot-Diconne.

⁵ 2008 report, C. Durand, Y. Gerber, p. 157-158.

⁶ 2008 report, C. Bouchaud, p. 169-170.

⁷ The study of the glass objects in particular is eagerly anticipated.

3.2. Results from 2008

In 2008, the remains uncovered inside tomb IGN 117 had been divided into two groups which corresponded to the two main phases of burial:

1/ **The earlier phase** comprised the material placed on the floor of the chamber in *loci* 50083 and 50088 (fig. 6 area A). To this phase belonged all the disarticulated bones associated with textile, leather, some wooden coffer (*locus* 50110, fig. 7) and some planks that could have belonged to a coffin. The preservation of the organic materials – skin, hair – was remarkably good in the *loci* of this phase. Resin residue, which could have been used for partial mummification, was noted on several textile fragments and on the skulls (fig. 8). The absence of skeletons in primary positions and the general condition of the remains of this early phase indicate that the burials were disturbed several times and probably at quite an early date. Radiocarbon analysis was done by the Gröningen laboratory on several bones from *loci* 50083 and 50088. Unfortunately, following a misunderstanding between the laboratory and the excavation team, two different bones which came from the same *locus*, were mixed together when preparing the sample to be dated. This occurred with two samples. The result of each date is thus the mean of the date of the two bones. However, the results obtained are coherent between themselves: the sample prepared using bones 50083_B1 and 50083_B2 gave a date of 1945 ± 25 BP, whilst the sample prepared using bones 50088_B3 and 50088_B4 gave a date of 1965 ± 75 BP. The calibrated dates allow the two samples to be placed in the 1st century AD (Appendix 1). This chronology fits with the data produced by the ceramicists: the pottery found inside IGN 117 is dated to between the middle of the 1st century AD and the 2nd century AD. Therefore, the first phase of use of the tomb corresponds with the family occupation during the Nabataean period which, according to the information in the cartouche carved above the entrance, probably began with its construction by Hînat, daughter of Wahbû, in AD 60/61.

2/ **The later phase** was represented by three skeletons found in their primary burial positions within a layer of yellow sand: *loci* 50085, 50086 and 50087 (fig. 6, area C). The bone sampled from individual 50087 for radiocarbon dating by the Gröningen laboratory did not contain enough collagen and, therefore, could not be dated. Thus, it seems that the bones from the later phase were less well preserved than those from the older phase. A simple cloth, which was noted during excavation but fell apart with contact with the air, had been used to wrap the body. It can be concluded that the preparation of the bodies of the three individuals from later phase was less careful than for the individuals of the earlier phase.

3.3. The 2009 excavation

In 2009, Nathalie Delhopital and Isabelle Sachet continued their excavation of tomb IGN 117. Nathalie Delhopital concentrated on the area of the earlier phase identified in 2008, called area A: Isabelle Sachet continued the clearance of the sandy layers in the back of the chamber, leading to the discovery of a pit tomb filled with bones, called area B (fig. 6).

3.31. Area A

Excavations in area A began in January 2008. After cleaning and removing the layer of aeolian sand in the back left (southwest) corner of the chamber, we quickly reached a level of bones laid directly on the bedrock (*locus* 50083). Due to the density of bones in the tomb, it proved difficult to make space in order to be able to excavate. As a result, the excavation along the left (south) wall of the burial chamber (*loci* 50088 and 50090) was restricted to a narrow band about 1 m wide. Many bones were found over a substantial depth.

In 2009, we decided to extend the excavation of this part of the tomb to cover an area of about 4 x 1.5 m. After removing the protective layer of sand, which had been put down at the end of the 2008 season, we immediately exposed archaeological layers rich in bones, leather (fig. 10), textile and wood (fig. 11), all in very well preserved (fig. 12). On the floor of the chamber, we also found an iron spear point (*locus* 50106), the first weapon found in an archaeological context in a Nabataean tomb (fig. 13), a small rope (*locus* 50168; fig. 14), a few pottery sherds and an animal bone. It was not possible to sample this bone during the 2009 season but we can say that it was mixed in with the human bones and it might, therefore, be an offering.

In so far as archaeological material was abundant against the south wall of the burial chamber, one can assume that it had all been deliberately pushed against the wall, either within the framework of a funerary rite, or during robbing.

We also excavated a layer that was relatively homogenous in terms of archaeological material and sediment, that is, layers of hard, greyish sand. In the section, alternating yellow and greyish sand were clearly visible. However, in section E1-E1' (figs 6, 15), the presence of a wooden plank is currently difficult to explain. Perhaps it is a second coffer, similar to that in *locus* 50115. Further excavation will clarify this point.

A pot standing on the floor (*loci* 50186 and 50193; fig. 15) was found embedded in a layer of plaster. One can imagine that either the surface in this place had been prepared for the installation of a superstructure or that the plaster layer represents the remains of an ancient surface that formed the floor of the burial chamber in which objects used in funerary rituals, for example a vase used to receive libations, had been placed. Further excavation is needed in order to better understand the presence of this plaster layer.

We continued the excavation of the wooden coffer at the feet of the *in situ* individuals 50085 and 50086, but few bones were discovered in the area exposed (*loci* 50128 and 50248). The excavation of this coffer has been deferred until the next season because the wooden planks are deeply embedded under archaeological layers that have not been excavated in 2009.

The discovery of leather, textiles, planks and a wooden peg (fig. 16) allow us to conclude that the individuals were probably buried in containers of different materials, in other words shrouds and/or coffins.

3.32. Area B

The only pit tomb found so far in the burial chamber of IGN 117 measures 2 x 1 m, and is 1.35 m deep (fig. 6). It is cut into the back right (northeast) corner of the chamber. It was no doubt closed originally by large covering slabs of sandstone resting on a groove cut on each side of the pit.

The fill of the pit tomb

The fill of the pit was divided into two main parts: 1/ an upper part with well preserved bones, up to *locus* 50211; 2/ a lower part with very friable material in poor condition.

The upper part of the fill was largely made up of bones and yellow sand, perhaps aeolian, whilst the lower part contained bones in greyer sand. It should be noted that the lower part contained a lot of wooden planks the rotting of which could have caused the degradation of the rest of the archaeological material (fig. 17).

The upper part of the pit contained bones only in secondary positions. The pit could thus have been used as an ossuary at a time when the floor of the chamber could no longer take any new burials, so that the older bones had to be pushed towards the pit in order to make space for new burials.

Four burials in primary position were found laid in the bottom of the pit (*locus* 50238), contained in a very black layer of wood in an advanced state of decomposition (fig. 18). The four individuals had probably been placed in the bottom of the pit in wooded coffins.

The archaeological material from area B (fig. 19)

Apart from the human bones, the pit contained very little archaeological material, especially when compared with area A where a large amount of leather and textiles were preserved (fig. 12). Some tiny pieces of cloth had remained stuck on only one skull (fig. 20). The absence of cloth and leather in the pit tomb is one more argument in favour of the creation of the pit as an ossuary in which the remains of already degraded burials would have been pushed.

Two fragments of animal bones were also found in the pit: a unidentifiable shaft in *locus* 50163 and a canid maxilla in *locus* 50152. A few fragments of white sandstone pavers and some wooden planks in very poor condition have already been mentioned above. Two rings, a bronze one in *locus* 50223 (fig. 21) and an iron ring on the hand of individual 50238 (fig. 22), are the only metal objects found in area B. As for the whole chamber, pottery is under-represented in the pit tomb: two pot sherds were found in *loci* 50150 and 50199, and a fragment of painted Nabataean pottery in 50206, this last dating to Schmid's phase 3b, made in Petra between AD 70 and 100.

3.33. Connection between areas A and B

To the south of the pit tomb, the connection between areas A and B was carefully examined during the excavation. Indeed, it was essential to understand how the pit had been filled. Had

the pit (area B) been filled with bones that had previously been placed on the floor of the chamber (area A) or had the bones placed on the floor of the chamber been taken out of the pit during a robbing episode?

The pit was filled with bones up to the top (figs 6, 23-24). If the bones had been taken out of the pit to be spread on the floor of the chamber by the robbers, the pit would have been largely empty. In addition, the east to west slope of the bones noted inside the pit (figs 6, 25) suggests that they were, rather, pushed from area A towards area B in order to make space for new burials on the floor of the chamber. The same east-west slope was noted between the doorway and the pit (fig. 26). If one follows this line of reasoning, the bones in area B should therefore be older than those in area A, which the radiocarbon dates that have been requested this year may be able to confirm. There is no doubt that the tomb was visited several times after it was first abandoned and that the most precious objects have disappeared. The state of preservation of the mummified bones, the presence of pottery and the large amount of sand that has accumulated on top of the remains tend to imply that the robbing occurred mainly in the distant past, probably in antiquity.

3.34. Area E: the tomb doorway

Clearing the doorway brought to light two successive phases of use characterised by two different systems of closure, which bear witness to at least two different funerary occupations (fig. 27).

The more recent system of closure is also the simplest one. It consists of superimposed sandstone slabs of which only one or two courses remain (fig. 28) but which was certainly higher when it was in use, in order to prevent animals from entering. This system of permanent closure of the tomb, using superimposed sandstone slabs cemented together across the doorway, has been noted in other tombs in Madâ'in Sâlih.⁸ The slab of the first course is exactly the width of the doorway, and if the slabs were similarly cut for several courses, which has been noted on other tombs, one can suggest that they were ordered at a time when the quarries of Hegra were still in use, since the slabs were cut to the exact measurement of the entrance.

The second, older, system of closure allowed for comings and goings. The tomb had a wooden door. A door socket cut in the north side of the doorway (on the right) shows that the door opened to the interior and pivoted from the south towards the north (from left to right). A notch, twenty centimetres wide, cut into the south doorjamb indicates that a wooden beam, activated from the exterior using a system that has not left any traces, was used to close the tomb.

The replacement of the non-permanent closing system of the way to tomb IGN 117 by a system of permanent closure bears witness to a change in habits of the tomb owners. Once the door was sealed, it was probably only re-opened for a new burial. This change in arrangement could have been due to a period of insecurity, during which the tombs were subject to frequent robbing, or

⁸ 2004 report, V. Bernard and L. Nehmé, "The doorways to the tombs".

to a change in the burial rituals, with the family no longer entering the tomb to perform acts of commemoration, but remaining outside to perform them.

3.35. Connection between areas A, C and E

The tomb doorway (area E, fig. 6) was covered with a thick layer of yellow sand up to the rock floor of the chamber. This was probably an aeolian deposit which blew in through the open doorway. The ancient material (a Nabataean jug decorated with chequering (“guillochis”) (fig. 29), a glazed Parthian jug (fig. 30), a stone dish with compartments (fig. 31), a small bronze bell (fig. 32) and some fragments of glass vessels) placed on the floor of the tomb, was preserved under this thick layer of sand. The position of these objects, found mostly in the doorway of the chamber (fig. 12), could underline the fact that the funerary offerings were deposited in this location because the rest of the chamber was inaccessible due to the amount of bones stored there.

The thickness of the layer of yellow sand in area E diminishes progressively towards the back of the chamber, and disappears completely near the pit tomb in area B (figs 6, 26, layer no. 10). The three articulated individuals in area C, found in 2008, were laid above the layer of yellow sand of area E. This means that the three individuals were buried in a phase later than that of the main funerary occupation of the tomb, in the second half of the 1st century AD.

On section AA' (figs 6, 34), one can see that the yellow sand of area E dips under the thick layer of material (wood, bones, textile and leather) of area A, which has a darker colour and contains archaeological material contemporary with that in area E (the layer of yellow sand is no. 8 in fig. 34). One can, therefore, put forward the hypothesis that the material in area A was disturbed during a robbing episode and that part of the material was then pulled towards the doorway.

3.4. Results of the anthropological study of the 2009 season

The study of the human bones from the excavation of tomb IGN 117 began in January 2008 and continued in January and February 2009.

3.41. Adaptation of excavation techniques for the anthropological study

In order to be able to work in a larger area, without damaging the archaeological material, scaffolding was put up above the excavation area. We also used a vacuum cleaner with a special nozzle (to prevent vacuuming tiny bones) to clean certain layers, particularly those where the bones, leather, wood and sand were very mixed.

In 2008, a plan of the bones was drawn on graph paper. In 2009, the plan of bones was done using photographs that were stitched together using topographic points taken by the topographers, Guillaume Charloux and Jean Humbert. Once the points and photographs had been taken, each bone was lifted and a number assigned to it (*locus* number followed by a number in the order of lifting within the *locus*), for example: 50170-1. The identification of each bone was also noted (e.g. humerus), its side (right), its orientation (east-west, proximal end to the west) and the visible side (posterior). The archaeological finds recovered were treated in the same manner.

The photographs were subsequently adapted using an illustration program, *locus by locus*. A colour pallet distinguishes the bones according to their identification, side, age of the individual, and sex for the pelvis bones, in order to show any grouping of bones and of individuals.

3.42. Preservation of the archaeological material

The preservation of the bones varied according to their position in the burial chamber (figs 1, 6; Appendix 2).

The bones found in the sandy fill (*loci* 50081, 50082 and 50084) were very well preserved, as were those of the articulated individuals (50085, 50086 and 50087 in area C) which were covered with sand.

In area A, the bones were very well preserved and many of them were mummified (Appendix 3; figs 35-36). The most likely explanation is natural mummification by desiccation. In fact, this type of mummification affects the limbs in particular, especially the distal extremities, hands and feet, which is explained by the fact that “the skin there covers the bone directly and it is thus less open to decay than the mass of muscles which surround the bones of the higher parts”.⁹

In the pit tomb (area B), the preservation of the bones varied according to the depth at which they were found. Down to a depth of 1 m (*loci* 50145 to 50211), they were as well preserved as those found in fills 50081 to 50084. However, from *locus* 50219 to *locus* 50249, the bones were very poorly preserved, including those of the *in situ* individuals on the floor of the pit tomb. Even though they looked “complete” when they appeared in the layer, they disintegrated during excavation and removal. Some bones were covered with a white substance, probably mould. This difference of preservation might be explained by the decomposition of the wood and the bodies, the liquids produced having stagnated in the bottom of the pit.

3.43. Demography

The results presented below are preliminary since only the bones found in the parts of the tombs excavated in 2008 and 2009 are discussed.

3.431. Minimum number of individuals (MNI)

3908 pieces of bone have been studied. Due to time constraints, we were unable to establish the MNI by exclusion by pairing, other than for the bones of immature individuals. We established an MNI by frequency by area as well as an MNI for the whole tomb (Appendix 4, graphs 1-2-3-4).

The MNI by frequency for adults for the whole of tomb IGN 117 is thirty-eight (Appendix 4, graph 1). The MNI was obtained using the left tibia and femur, and the right talus.

The MNI by frequency for immature individuals, which was obtained using the right ulna, was seventeen (Appendix 4, graph 4). The MNI by exclusion by age, however, was twenty-six. The minimum number of individuals buried in tomb IGN 117 is, therefore, sixty-four.

⁹ Arbogast 1965, p. 61, in Maureille and Sellier 1996.

The minimum number of adult individuals in the pit tomb (area B) is twenty-six and for area A it is twenty-two (Appendix 4, graphs 2 and 3). Immature individuals were distributed as follows: six in the pit tomb and seventeen in area A. We shall see below, in the section on archaeoethanatology, why these numbers must be used with caution.

3.432. Distribution by age and sex

It has been possible to estimate the age of twenty-five adults. Three belonged to age group 20–29 years, eight to the group 30–39 years, ten to the group 30–49 and one individual was more than 50 years old. Regarding the *in situ* individuals, 50085 was over 40 years old, 50087 between 30 and 59 years, and 50238 between 20 and 29 years old.

The twenty-six immature individuals were spread across seven age groups (Table 1 below). Individuals 50086 and 50245 were between 5 and 9 years old and individual 50247 was between 1 and 4 years old.

Table 1: Distribution of immature individuals by age group

| Age group | Number of individuals |
|------------------------|-----------------------|
| Foetus | 1 |
| Perinatal ¹ | 4 |
| 0 | 3 |
| 1-4 years | 6 |
| 5-9 years | 7 |
| 10-15 years | 1 |
| 15-19 years | 4 |

¹ We have considered here that it means from eight gestational lunar months (28 days) to one calendar month (after birth). In 2008, we had considered it meant from six gestational lunar months, but this figure is too low.

With regard to sex, twenty-one left and twenty-three right pelvis bones were preserved well enough to be diagnosed. To this group, we must add the *in situ* individuals 50085 and 50238. It was possible to determine the sex of twenty-six adults and one adolescent, resulting in thirteen males and thirteen females. The *in situ* individuals (50085 and 50238) were female (Appendices 5 and 6).

As an example, the distribution of sexed individuals in areas A and B is the following (Table 2):

Table 2: Distribution of sexed individual in areas A and B (M = male, F = female)

| Side | Left | | Right | |
|--------|------|---|-------|---|
| Sex | M | F | M | F |
| Area A | 5 | 2 | 6 | 6 |
| Area B | 8 | 6 | 7 | 7 |

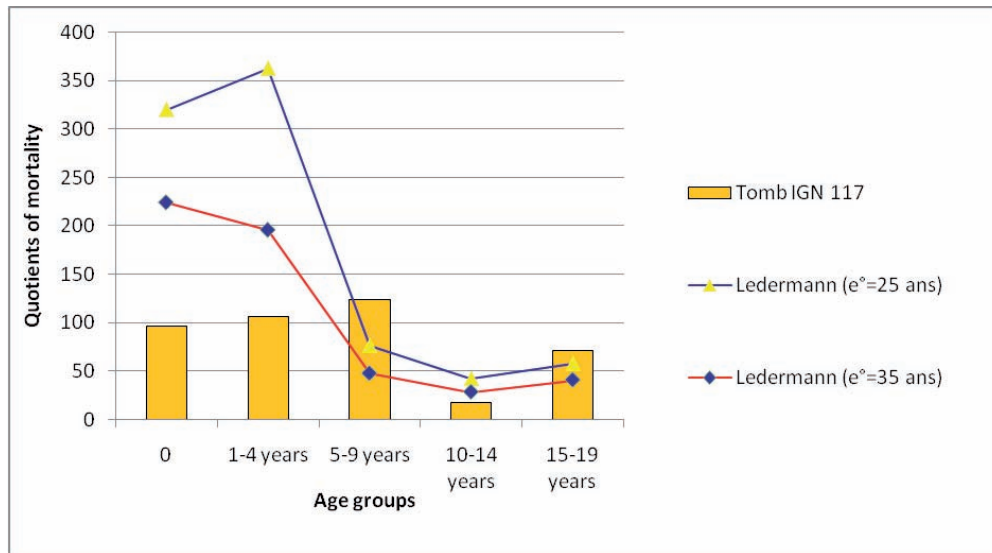
There is the same number of males as females in both areas.

3.433. Demography

Based on the results, we have been able to carry out a demographic study. The mortality curves established for immature individuals (Table 3 below) were compared to those developed by

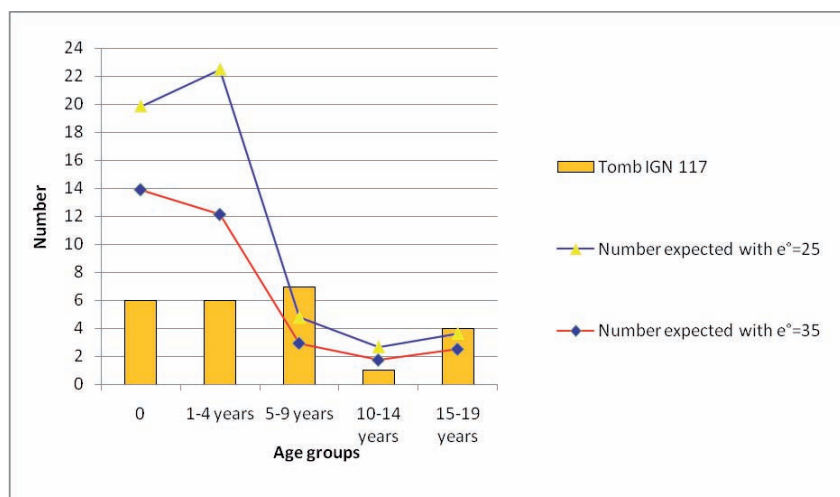
S. Ledermann in 1969 for populations with pre-jennerian morality profiles.¹⁰ Analysis of the graphs shows that the quotient of children in tomb IGN 117 who died aged between 0 and 5 points to a demographic anomaly: they are, in fact, below the reference quotients. Conversely, the quotients for the age groups between 5 and 19 years are above the reference quotients.

Table 3: Comparison of the mortality quotients for groups of age between 0 and 19 years for IGN 117 with a large mortality profile from antiquity (type tables from Ledermann 1969) (NMI (0-19 ans) = 8; NMI total = 30)



In order to evaluate the importance of the deficit of children in the tomb, we calculated what their theoretical total should have been. If one compares the expected number of children of 0 years with those found in the tomb, it seems that at least eight children of less than 1 year of age are missing, and six between the ages of 1 and 4 (Table 4 below).

Table 4 : Comparison of the actual dead in tomb IGN 117 with the expected



¹⁰ The pre-jennerian populations are populations from before the widespread use of vaccines, particularly against smallpox.

These anomalies can be explained in various ways. Firstly, the tomb has not yet been fully excavated, which probably explains the under-representation of young children, but also of adults. Additionally, the age determination of immature individuals using stature, for those aged between 5 and 14 years, must be used with care since individual and inter-population variations affect the precision of the age determination. In older children, it is at best possible to place an individual in an age group.¹¹ This method can be applied very well to much younger immature individuals, that is early foetal and perinatal deaths, since at this point in their lives external factors have not yet influenced their development.¹² Therefore, it is possible that individuals for whom an age of 5-9 years is given are in fact aged from 1 to 4 years old. However, it should be noted that even by putting the individuals from the 5-9 year age group into the 1-4 year age group, the latter still remain under-represented. This under-representation of young children could equally be explained by a different burial practice, but the presence of at least six children aged between 0 and 8 months must be underlined. In antiquity, children less than 1 year old were often treated differently from the adults and buried in distinct places (as is the case, for instance, in the Roman world). Their presence in tomb IGN 117 is, therefore, of great interest and the absence of a part of these young children must be questioned. Differential preservation does not really explain this absence since the bones of the immature individuals were as well preserved as those of the adults. It could be due to a selection based on the sex of the child. This theory can only be verified once the excavation and study of the material from the tomb have been completed.

3.44. Observations based on archaeoethanatology

During the excavations, we noticed three main coherent groups in the spread of human bones: areas A, B and C (fig. 6).

3.441. Area C

During the 2008 season, three individuals, consisting of one female (50085), one adult of indeterminate sex (50087) and one immature individual (50086), were found *in situ* against the south (left) wall, placed on 30 cm of sand (figs 37-38). They were oriented east-west. The heads of individuals 50085 and 50086 were at the east end, with individual 50085 looking northwards, and the head of individual 50087 was at the west end.

All three were primary burials, but individual 50086 had been disturbed. The epiphyses of the femurs and the legs, feet and hands were all articulated but the rest of the body was missing. Where the head should have been, a fragment of maxilla was found of the same bone maturity as the lower limbs. Despite careful excavation below and beside the skeleton, no other parts of it were found. The presence of the legs and hands, combined with the absence of the rest of the body, could be the result of human interference.

¹¹ Le Hors 1991.

¹² Bruzek *et al.* 2005.

The three individuals were laying supine, with lower limbs extended. The upper limbs of 50086 were missing, but the upper limbs of 50085 and 50087 were in the same position: the left arm on the pubis and the right arm straight along the body.

The position of the bones and the discovery of very friable textile confirm that the individuals had been buried in some wrapping.

The fact that the general contours of skeleton 50087 were preserved and that the wooden coffer, which blocked the feet of the immature individual (50086), was already present when the individuals were buried leads to the following order of deposition: individual 50085 was certainly buried first, followed by the child 50086 and finally the second adult, 50087. However, the time interval separating the burials cannot be determined.

3.442. Area A

Area A comprises the bones found against the south wall of the burial chamber (fig. 39). With the exception of two parts, some legs (*locus* 50226) (fig. 40) and a foot (*locus* 50170) (fig. 41), no articulated bones were found that were not mummified. The presence of two articulated parts can be explained by the fact that these bones were probably already mummified when this area was disturbed and the skin disappeared subsequently.

Apart from the skulls (*locus* 50083) which were found mostly against the south wall of the chamber, the other bones do not seem to have been gathered together. Several hypotheses might explain this grouping of skulls:

- certain individuals were buried north-south, the head against the south wall and so the skull would hardly have been disturbed;
- a funerary rite which deliberately placed the skulls against the wall.

Bones belonging to the same individual were sometimes far from each other: we found a gap of up to 1 m separating the left femur from the right femur of one individual, evidence of some serious disturbances (fig. 42).

3.443. Area B

Excavation of the pit tomb brought to light many mixed bones, as well as *in situ* individuals at the bottom (figs 43-45).

Individuals 50238 and 50247 were the first to be buried in the pit, then two more bodies (50245 and 50246) were placed on top (figs 18, 46).

The female individual 50238 was oriented north-south, the head to the north (fig. 47). The skeleton was disturbed and the spinal column wasb completely mixed up. Part of the upper right limb was missing and only the proximal part of the ulna remained. The lower body was also disturbed, part of the right femur was missing and only the proximal ends of the tibias and fibulas remained. The feet were not found. These disturbances were probably linked to the deposition of new bodies. In spite of the disturbances, it was possible to determine that individual 50238

was lying supine, with lower limbs extended and the left arm folded onto the stomach. We can also state that this was a primary burial, thanks to the overall preservation of the contours of the skeleton and the presence of small bones.

Immature individual 50247 was oriented, like individual 50238, north-south with the head to the north (fig. 48). It was also disturbed. In fact, only the pelvis, hands, femurs and proximal epiphyses of the tibias and fibulas remained. Nevertheless, it was possible to say that this individual was laying supine, upper limbs slightly bent since the hands were on the pubis, and the lower limbs extended. The fact that the pelvis of individual 50247 had not been disturbed when individual 50246 was put in place suggests that either the two individuals were deposited together, or that individual 50247 was in the process of decomposing when 50246 was deposited. The hypothesis of natural mummification for individual 50247 has been discarded because the conditions of preservation in the bottom of the pit tomb do not lend themselves to it. The presence of the hands and pelvis show that this was a primary burial.

Individual 50245 was immature and was placed above individual 50238 (fig. 46). Parts of the body were missing, but the pelvis, the un-fused proximal epiphyses of the right femur, the lower right arm and hand, the un-fused distal epiphyses of the left femur, the tibias, left fibula and right foot remained. We were able to establish that the individual was lying supine with the upper right limb extended along the body. The presence of the hands and the preservation of the overall contours of the skeleton show that this was a primary burial. The disturbance was probably linked to the subsequent placing of new bodies or to robbing.

Individual 50246 was an adult and was placed above individual 50247 (fig. 50). It was oriented, like individual 50245, north-south with the head to the south. The fact that the tibias and fibulas were still *in situ* (the only remains) and articulated suggests a primary burial and shows that the lower limbs were extended.

The position of the individuals head to toe is interesting, and this was also the case with individuals 50085, 50086 and 50087. This alternation could have been employed in order to optimise space. Therefore, it is probable that the intention was to place a large number of bodies in the pit tomb. However, above these individuals, many mixed bones were found, on which the following remarks can be made.

Firstly we noted that the majority of bones were found in the south end of the pit tomb (fig. 45), and that these were mostly long bones. Most of the skulls were found against the west side of the pit. There were very few bones in the northeast part of the pit (*loci* 50142, 50143, 50145, 50146, 50149, 50150) (fig. 45). We also noted some grouping of bones that belong to same individuals: vertebrae and ribs on the south part, in *loci* 50199, 50200 and 50204 (fig. 51). Either the individuals were buried in the pit and were then disturbed, during robbing or a burial rite, or the bodies were still in the process of decomposing when the bones were moved within the pit.

Apart from the case of the articulated individuals resting on the bottom of the pit tomb, very few articulated bones were found (fig. 52):

- a middle and distal phalange of a hand (50158);
- a femur and pelvic bone (50166);
- an immature radius and ulna (50197);
- three groups of vertebrae (50223).

Several hypotheses can be put forward to explain the preservation of these articulations:

- certain individuals were deposited whilst they were in the process of decomposition;
- the bones could have mummified naturally and the skin disappeared subsequently, hence certain parts remained in position.

We were also able to carry out some pairing and joining within the same *loci* (50165, 50176) (fig. 53). We have not yet done any pairing between different *loci*. This study will show the extent of the movement of the bones inside the pit tomb.

3.444. Interpretation

It is highly likely that the first individuals to be buried in IGN 117 were those that were buried on the bottom of the pit tomb (individuals 50238, 50245, 50246, 50247, in area B). In fact, we noted that the mixed bones were found on top of these individuals and that they disturbed the skeletons, particularly in the southern part of the pit. During the same period, some individuals were deposited on the floor of the chamber (area A). Subsequently, the bones of these individuals could have been pushed into the pit (area B) which, in such a case, would have served as a dump. Indeed, we noted that small bones were more numerous in area A (Appendix 4, graphs 2 and 3) and long bones more numerous in area B. It is, therefore, possible that when the bones were pushed into the pit, the small bones remained on the floor of the chamber. Subsequently, new individuals were deposited on the floor of the chamber (area A). Robbing episodes probably also contributed to the disturbance of the bones. At a later date, some individuals (50085, 50086 and 50087) were deposited in area C, and afterwards the tomb was probably robbed, since we found bones from area A on the legs of individual 50085.

3.45. Biological characteristics

3.451. The discrete traits

Of the ninety-two traits studied, five are recurrent (Table 5, below): septal aperture, sacralization of the fifth lumbar vertebra (figs 54, 55), the vastus notch on the patella, the bipartite anterior calcaneal facet (fig. 56), and the trigonum talus.

Table 5: The most commonly reoccurring discrete traits in tomb IGN 117 (L = left, R = right, U = unilateral).

| Bone | Humerus | | Patella | | Calcaneum | | Talus | | Sacrum |
|--------------------------------------|-----------------|--------|--------------|----|------------------------------------|--------|----------------|--------|--|
| Characteristic | Septal aperture | | Vastus notch | | Bipartite anterior calcaneal facet | | Trigonum talus | | Sacralization of the fifth lumbar vertebra |
| Tomb IGN 117 | L | R | L | R | L | R | L | R | U |
| <i>Absent</i> | 11 | 15 | 24 | 20 | 17 | 14 | 21 | 26 | 14 |
| <i>Present</i> | 5 | 7 | 4 | 6 | 14 | 11 | 9 | 7 | 10 |
| <i>Total</i> | 16 | 22 | 28 | 26 | 31 | 25 | 30 | 33 | 24 |
| Area A | | | | | | | | | |
| <i>Absent</i> | 3 | 5 | 14 | 8 | 10 | 11 | 15 | 15 | 2 |
| <i>Present</i> | 2 | 5 | 1 | 3 | 10 | 6 | 6 | 4 | 8 |
| <i>Total</i> | 5 | 10 | 15 | 11 | 20 | 17 | 21 | 19 | 10 |
| Area B | | | | | | | | | |
| <i>Absent</i> | 8 | 8 | 10 | 12 | 7 | 3 | 6 | 11 | 12 |
| <i>Present</i> | 3 | 2 | 3 | 3 | 4 | 5 | 3 | 3 | 2 |
| <i>Total</i> | 11 | 10 | 13 | 15 | 11 | 8 | 9 | 14 | 14 |
| Fisher test $p^2=$ | 0.5604 | 0.3498 | 0.3111 | 1 | 0.7074 | 0.3892 | 0.5589 | 0.3886 | 0.0022 |

² If $p < 0.05$, there is a significant difference between the presence of the discrete traits in the different areas.

Since the bones were not found articulated, it is impossible to know if the discrete traits noted belonged to one or several individuals. Some of these characteristics might be population markers, such as the vastus notch on the patella, the trigonum talus and the bipartite anterior calcaneal facet.

The sacralization of the fifth vertebra is particularly interesting. This fusion (partial or complete) of the fifth lumbar vertebra can produce secondary clinical complications causing pain in the lower back or provoking obstetric difficulties.¹³ This characteristic has genetic origins.¹⁴ It was far more common in area A than in area B. It is, therefore, likely that the individuals buried in the tomb, and more particularly those found in area A, were related (for the relationship between the bones in areas A and B, see paragraph 3.444).

3.452. The metrical data

Estimates of stature are made using whole long bones. 177 long bones, plus the bones of individuals 50085, 50086, 50238 and 50246, were preserved well enough for such estimates to be made (Table 6, below).

The stature of these individuals varies between 1.39 m (± 4.83 cm) and 1.78 m (± 4.83 cm). However, the maximum and minimum statures are obtained using the humerus. We can see that for individuals 50085 and 50087, the results based on the humerus vary between at least 7 cm to 13 cm from those of the femur. We also know that the bone that is best correlated to stature

¹³ Saunders 1978; Masnicova and Benus 2003.

¹⁴ Barnes 1994.

is the femur. Based on the femurs, the stature of individuals varies between 1.45 m and 1.71 m. We do not include the result of 1.44 m because the bone in question is affected by some pathology. The two female individuals (50238 and 50085), found *in situ*, measure 1.50 m and 1.52 m (Table 7, below).

Table 6: Stature estimates based on long bones (L = left, R = right)

| Bones | L Humerus ± 4.83cm | R Humerus ± 4.83cm | L Ulna ± 5.09 cm | R Ulna ± 5.09 cm | L Radius ± 5cm | R Radius ± 5cm | L Femur ± 4.13cm | R Femur ± 4.13cm | L Tibia ± 4.18cm | R Tibia ± 4.18cm | L Fibula ± 4.03cm | R Fibula ± 4.03cm |
|---------|-----------------------|-----------------------|---------------------|---------------------|-------------------|-------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|
| | 139.80 | 145.73 | 148.10 | 150.69 | 145.85 | 146.38 | 144.65 ³ | 145.22 | 150.30 | 154.83 | 148.75 | 144.28 |
| | 144.54 | 146.12 | 154.32 | 151.73 | 147.97 | 147.97 | 152.06 | 148.93 | 152.42 | 154.83 | 153.85 | 153.85 |
| | 145.33 | 147.70 | 154.32 | 155.87 | 155.39 | 155.39 | 153.77 | 152.06 | 153.32 | 159.06 | 155.45 | 155.45 |
| | 153.63 | 150.47 | 156.91 | 156.39 | 156.98 | 155.92 | 155.77 | 152.35 | 154.83 | 161.78 | 157.68 | 156.72 |
| | 154.02 | 154.42 | 161.05 | 156.91 | 158.04 | 156.45 | 156.05 | 152.63 | 158.76 | 163.29 | 158.64 | 161.19 |
| | 155.60 | 155.21 | 164.16 | 157.95 | 158.57 | 156.45 | 160.33 | 153.20 | 160.27 | 164.80 | 161.83 | 163.42 |
| | 159.55 | 157.58 | 164.16 | 163.13 | 159.63 | 162.81 | 162.04 | 154.63 | 160.87 | 165.10 | 173.31 | 170.44 |
| | 159.55 | 163.11 | 165.20 | 163.64 | 161.22 | 164.40 | 163.18 | 156.05 | 160.87 | 166.91 | | 170.76 |
| | 161.53 | 165.08 | 165.72 | 164.68 | 163.87 | 167.05 | 163.46 | 156.05 | 161.17 | 167.21 | | |
| | 161.53 | 165.87 | 167.27 | 164.68 | 163.87 | 167.58 | 165.17 | 157.48 | 161.48 | 168.42 | | |
| | 166.66 | 168.24 | 168.82 | 169.86 | 164.40 | 168.64 | 166.03 | 157.48 | 162.68 | 168.42 | | |
| | 171.80 | 169.43 | 169.86 | 169.86 | 168.64 | 170.76 | 166.88 | 160.33 | 164.50 | 168.42 | | |
| | | 169.43 | 170.90 | 171.93 | 169.70 | 171.29 | 168.88 | 163.18 | 164.80 | 169.93 | | |
| | | 174.17 | 173.49 | 172.45 | 171.29 | 172.35 | 170.30 | 164.03 | 166.91 | 169.93 | | |
| | | 178.51 | 173.49 | 173.49 | 172.35 | 173.94 | 171.73 | 164.60 | 166.91 | 171.44 | | |
| | | | 177.11 | 173.49 | 172.88 | 174.47 | | 168.02 | 168.42 | | | |
| | | | | 175.56 | 174.47 | 174.47 | | 168.88 | 168.42 | | | |
| | | | | 177.63 | | 174.47 | | 171.44 | 169.93 | | | |
| Average | 156.13 | 160.74 | 164.68 | 165.00 | 162.65 | 164.49 | 161.35 | 158.14 | 161.49 | 164.96 | 158.50 | 159.51 |

3 Femur showing pathology.

Table 7: Stature of the *in situ* adults

| Bones | Sex | L Humerus ± 4.83cm | R Humerus ± 4.83cm | L Ulna ± 5.09 cm | R Ulna ± 5.09 cm | L Radius ± 5cm | R Radius ± 5cm | L Femur ± 4.13cm | R Femur ± 4.13cm | L Tibia ± 4.18cm | R Tibia ± 4.18cm | L Fibula ± 4.03cm | R Fibula ± 4.03cm |
|-------|-----|-----------------------|-----------------------|---------------------|---------------------|-------------------|-------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|
| 50087 | I | 169.03 | - | 179.24 | 181.89 | 181.26 | 182.81 | - | - | - | - | - | - |
| 50085 | F | 145.44 | - | 159.00 | 158.40 | 156.15 | 155.58 | 152.32 | 152.60 | 153.88 | 153.876 | 152.08 | 152.424 |
| 50238 | F | 150.05 | - | - | - | - | - | 150.30 | - | - | - | - | - |
| 50246 | I | - | - | - | - | - | - | - | - | 157.85 | - | 153.85 | - |

3.453. Pathology

Some pathology is present on the articulations, especially on the vertebrae. It is not possible to determine if these were linked to age or to a particular activity, since the bones were not *in situ*.

We also noted some fractures, on two ribs (fig. 57) and on the distal part of two ulnas (fig. 58), which might have been the result of minor falls.

There was also a malformation of a sacrum, spina bifida (fig. 59), which is a malformation of the last vertebrae (lumbar and sacral). This opening onto the marrow can produce paraplegia of the two lower limbs (complete or partial) which can compromise locomotion. This condition can be observed at birth.¹⁵

Finally, we noted a malformation of the head of a femur (fig. 60) which provoked arthritis of the pelvis bone and probably handicapped the individual.

4. Conclusions of the study of tomb IGN 117

4.1. Chronology of events in area B (pit tomb), from the oldest to the most recent

The pit tomb served a double function. In the first instance, it would have been made to shelter primary burials deposited in coffins at the bottom of the pit, perhaps including Hînat, the founder of the tomb. Unfortunately, the poor condition of the bones at the bottom of the pit do not permit any dating of the four skeletons, but it was possible to determine the sex of the one of them, a woman. Several skulls were later placed on top of the burials, in *locus* 50234, against the sides of the pit (fig. 61), which represents a funerary rite that is difficult to interpret. Should we understand this as a simple gesture of clearing by an undertaker who arranged the skulls on one side and the long bones a bit further along through simple expediency? Were the skulls placed there to “seal” the burials at the bottom of the pit, and to make them inviolable through a particular ritual, for example by using the skulls of family ancestors as protection?

Above the skulls, several sandstone slabs seem to have subsided into the pit. These might be the remains of the original covering of the pit (*locus* 50239, figs 19 and 62). The rest of the cover was probably recycled because the sandstone slabs found in the pit were not sufficient to cover it. Some very poorly preserved wooden planks, some of which were pegged together (*loci* 50227, 50228 and 50230; figs 19 and 63-64), were found above the skulls and sandstone slabs. In the *loci* above the wooden planks, the high density of bones in the southern quarter of the pit indicates that this part of the pit might have been used as an ossuary (*locus* 50204; fig. 65). The wooden planks might have formed shuttering that was used to contain the bones in a secondary position. Two joined fragments of wood in the southeast corner of the pit might be the only traces of the bottom of missing shuttering (*locus* 50231; fig. 66). In France today, when a body is deposited in a family tomb, the remains of the previous occupant are still gathered into a box placed at the foot of the new burial.

4.2. Chronology of events in area A

The reworkings noted during excavation probably go back to a relatively ancient date, in antiquity, but at a time when the tomb had already been abandoned. The ancient material from the chamber might have been partly spread out by robbers from the back of the chamber and the pit tomb towards the doorway, no doubt in order to find any valuable objects. However, it is likely that when the tomb was first abandoned, the chamber already resembled a “giant

¹⁵ Aufderheide and Rodríguez-Martín 1998.

ossuary”, with a large amount of bone on the floor of the chamber that needed to be pushed towards the back of the tomb and the pit tomb, in order to make some space for later burials.

4.3. At least two successive funerary occupations

The two systems for closing the doorway, the first and impermanent system allowing easy entry into the tomb using a door, and the second, permanent, system made of superimposed sandstone slabs blocking the entrance, bear witness to two successive and different occupations of tomb IGN 117. We can assume that the first system dates to the construction of the tomb, towards AD 60, whilst the second system of closing the entrance would be later, but nevertheless contemporary with activity in the city’s quarries. Therefore, the second system would be no later than the 5th to 6th centuries AD.

The tomb was not emptied when it was re-used and the burials of the first phase remained inside. In the absence of evidence of anything other than funerary activity inside the tomb, it is probable that the second occupation was also for funerary purposes. This second use could correspond to the inhumation of the three individuals in area C, found above the other archaeological levels. Given that none of them was associated with archaeological material, the radiocarbon dating that has been asked for on these bones will inform us on the date of these inhumations.

4.5. Funerary rituals

The small amount of pottery found inside the tomb is striking. With the exception of two or three sherds, all the pottery was found near the entrance of the tomb, and all belong to the same forms: a Nabataean jug imported from Petra and a glazed Parthian jug. A curious stone dish, the interior of which is carved into compartments, was also found in the same place. The position of this material, near the entrance, could indicate that the living came to deposit their offerings to the dead in containers made for this purpose. Thus, the dead would have been buried with relatively few offerings, with the exception of their clothing and a few accessories, for example an object of daily use such as a comb, or a weapon if the person was a warrior or a hunter. The same conclusion was drawn in a tomb in Petra, Brünnow no. 303, excavated in 2006 by Isabelle Sachet and Nathalie Delhopital. The funerary chamber contained relatively few remains of offerings, with the exception of three complete vases placed near the entrance to the tomb and ossuary.¹⁶

The aridity of the Saudi Arabian climate has preserved organic matter that was unknown in Petra: black substances applied on the cloth used to wrap the bodies of the dead were found in tombs IGN 20 and IGN 117. The analysis of these has shown that they are di- and triterpenic resins used in procedures to preserve bodies.¹⁷ The most interesting new information gathered from excavation of the tombs in Hegra is the Nabataean use of conservation procedures aimed at preserving the bodies of the dead. The absence of texts relating to a belief in an after-life amongst the Nabataeans does not mean that we must abandon this idea. Indeed, the desire,

¹⁶ Augé, Sachet 2006; French archaeological project in Petra, directed by Ch. Augé, forthcoming.

¹⁷ Mathé, Archier, Nehmé *et al.* 2009.

which can be observed in the Hegra tombs, to preserve the appearance of the body intact after death, could be evidence of a belief in the re-birth of the dead into another life.

4.6. Anthropological conclusions

The excavation of tomb IGN 117 produced sixty-four individuals, of which thirty-eight were adults (thirteen males and thirteen females) and twenty-six were immature individuals. An under-representation of young children was noted, which could reflect a different funerary treatment for age groups 0 and 1–4 years. The study of discrete traits revealed the existence of relatedness between the individuals buried in tomb IGN 117. We were also able to establish that the stature of individuals varied between 1.45 m and 1.71 m. Some pathology was noted, some of which could have produced a handicap.

5. Bibliography

- Aufderheide A. C. and Rodríguez-Martín C., 1998: *Encyclopedia of Human Paleopathology*, Cambridge: Cambridge University Press.
- Augé Chr., Bernard V., Dal-Prà P., Gerber Y., Nehmé L., Sachet I. in press: "Report on the 2004, Fourth Season, of the Saudi-French Archaeological Project at Medain Salih", *Atlat*.
- Augé Chr. and Sachet I. 2006: "Ath-Thughra necropolis, Petra. FAUPP (Funerary Areas understanding Petra's Project), French archaeological mission in Petra's Necropolis. [29th November-20th December 2006]", *Munjazat* 7, p. 92-93.
- Barnes E. 1994: *Developmental defects of the axial skeleton in paleopathology*, Colorado: University Press of Colorado.
- Bruzek J., Schmitt A., and Murail P. 2005: "Identification biologique individuelle en paléanthropologie. Détermination du sexe et estimation de l'âge au décès à partir du squelette", in Dutour O., Hublin J.-J., Vandermeersch B. (eds), *Objets et méthodes en paléanthropologie*, Paris: Comité des Travaux. p. 217-246.
- Healey J., 1989: "A Nabataean Sundial from Mada'in Salih", *Syria*, 66, p. 331-336.
- Healey J., 1993: *The Nabataean Tomb Inscriptions of Mada'in Salih*, Journal of Semitic Studies Supplement 1, Oxford.
- Le Hors P. B. 1991: "Age et croissance des enfants : Méthode d'étude et de comparaison", *Actes des 5e Journées Anthropologique, Dossier de Documentation Archéologique*, 14, p. 103-112.
- Masnicova S., and Benus R. 2003: "Developmental Anomalies in Skeletal Remains from the Great Moravia and Middle Ages Cemeteries at Devin (Slovakia)", *International Journal of Osteoarchaeology*, 13, p. 266-274.
- Mathé C., Archier P., Nehmé L., Vieillescazes C. 2009: "The Study of Nabataean Organic Residues from Madâ'in Sâlih, Ancient Hegra, by Gas Chromatography-Mass Spectrometry", *Archaeometry* 51, 4, p. 626-636.
- Maureille B. and Sellier P. 1996: "Dislocation en ordre paradoxal, momification et décomposition : observations et hypothèses", *Bulletins et Mémoires de la Société d'Anthropologie de Paris* 8, p. 313-327.

Appendix 1. Radiocarbon analysis

Table summarising the results from the Gröningen laboratory:

| <i>MS N°</i> | <i>Gröningen N°</i> | <i>Tomb N°</i> | <i>Absolute Date</i> | <i>Calibrated date</i> |
|--------------|---------------------|----------------|----------------------|---|
| 50068_B1 | GrA-39509 | IGN 20 | 1845 ± 25 BP | 90-101 cal AD – 124-236 cal AD (at 2 sigma 95%) |
| 50074_B7 | GrA-39511 | IGN 20 | 1920 ± 25 BP | 28-40 cal AD – 50-129 cal AD (at 2 sigma 95%) |
| 50083_B1+B2 | GrA-39516 | IGN 117 | 1945 ± 25 BP | Invalid result |
| 50088_B3+B4 | GrA-39726 | IGN 117 | 1965 ± 75 BP | Invalid result |
| 50087_B4 | none | IGN 117 | none | Lack of collagen |
| 50087_B5 | none | IGN 117 | none | Lack of collagen |

Assessment of the dates obtained in 2008

We are satisfied with the dates obtained in 2008 because they allowed us to confirm the hypothesis that the bones found in tomb IGN 20 were indeed contemporary with the rest of the archaeological material and the Nabataean inscription engraved on the tomb façade.

However, we regret that the Gröningen laboratory was unable to date three of the samples, in particular those from tomb IGN 117. This was due to the lack of collagen in some of the bones, and because two groups of samples were mixed up by the laboratory following a misunderstanding. Nonetheless, it should be noted that both bones in each of the two mixed samples, 50083_B1+B2 and 50088_B3+B4, come from a single *locus*.

Requests for dates from the 2009 season

If at all possible, we would like to ask for two dates: the first on an articulated individual in the upper levels of the tomb (*locus* 50085), the second on a bone from the large pit tomb cut into the northwest corner of the burial chamber (*locus* 50206).

***Locus* 50085**

Obtaining a date on a bone from individual 50085 would allow us to confirm the hypothesis that the three articulated skeletons discovered in the southeast corner of the burial chamber were inhumed after the main occupation of the tomb, that is after the Nabataean and Roman period.

We noted that the three individuals had been placed against some wooden coffer, which had been placed there previously. In the current phase of the excavation, the coffer is associated with a large number of well preserved, sometimes mummified bones, mixed with leather shrouds, and it seems to be contemporaneous with the first phase of occupation of the tomb.

Dating the bone from *locus* 50085 would allow us to confirm that the inhumations placed against the wooden

coffer are later than the rest of the occupation in the tomb, and would also give the date of the last phase of use of the tomb, which would answer the following question: are these burials from the pre-Islamic or Islamic period?

Locus 50206

The bones found in the large pit tomb cut in the northwest corner of tomb IGN 117 (area B) are less well preserved than the bones placed on the floor of the burial chamber. No mummified bones nor leather shrouds were found. Was the pit tomb used as an ossuary in which to place the bones of individuals in an advanced state of decomposition in order to make room on the floor of the tomb for new burials? If this was the case, the bones found in the pit are older than the bones deposited on the floor of the tomb. Only a radiocarbon analysis will allow the fact that the bones deposited in the pit are the oldest ones in the tomb to be confirmed.

Appendix 2. Distribution of the *loci* in the various areas

Cleaning of the upper layers: 50081, 50082, 50084.

Upper layer of sand: 50098, 50112, 50113, 50117, 50118, 50122, 50125, 50126, 50129, 50131, 50132, 50136, 50102, 50103.

Area A : 50083, 50088, 50090, 50091, 50092, 50094, 50096, 50097, 50099, 50100, 50104, 50105, 50106, 50109, 50114, 50115, 50116, 50119, 50120, 50121, 50123, 50124, 50127, 50128, 50130, 50133, 50134, 50135, 50137, 50140, 50141, 50144, 50147, 50148, 50153, 50154, 50155, 50157, 50159, 50161, 50162, 50167, 50168, 50170, 50171, 50172, 50173, 50174, 50175, 50181, 50182, 50183, 50184, 50185, 50186, 50188, 50189, 50190, 50191, 50192, 50193, 50194, 50195, 50196, 50198, 50201, 50202, 50203, 50205, 50207, 50210, 50212, 50213, 50214, 50215, 50216, 50217, 50218, 50220, 50221, 50222, 50224, 50226, 50229, 50232, 50233, 50235, 50237, 50240, 50244, 50248, 51644, 50089.

Area B : 50142, 50143, 50145, 50146, 50149, 50150, 50151, 50152, 50156, 50158, 50160, 50163, 50165, 50166, 50169, 50176, 50177, 50178, 50179, 50180, 50187, 50197, 50199, 50200, 50204, 50206, 50208, 50209, 50211, 50219, 50223, 50225, 50227, 50228, 50230, 50231, 50234, 50236, 50239, 50241, 50242, 50243, 50238, 50245, 50246, 50247, 50249.

Area C : 50085, 50086, 50087.

Area D : 50101, 50138, 50139.

Appendix 3. The mummified bones

MTC: metacarpal, MTT: metatarsal, TV: thoracic vertebra, LV: lumbar vertebra, PPH: proximal phalange of the hand, MPH: medial phalange of the hand, DPH: distal phalange of the hand, PPF: proximal phalange of the foot, MPF: medial phalange of the foot, DPF: distal phalange of the foot.

| <i>Bone</i> | <i>Locus</i> | <i>N°</i> | <i>Side</i> | <i>Mummified bone</i> |
|----------------|--------------|-----------|-------------|---|
| Cranium | | | | With hair |
| Humerus | 240 | 18 | R | Skin |
| Humerus | 226 | 27 | R | Diaphysis and ossification point |
| Ulna | 229 | 35 | R | Skin and tendon |
| Ulna+radius | 168 | 15 | R | |
| Ulna | 229 | 37 | | Skin and tendon |
| Radius+lunatum | 240 | 19 | R | |
| Scapula | 168 | 12 | L | Skin |
| Scapula | 168 | 3 | R | Skin |
| Hand | 240 | 25 | L | MTC1, MTC3, MTC4, MTC4, capitatum, hamatum, lunatum, scaphoid, pisiform, trapezium, trapezoid, triquetrum, 4PPH, 4MPH, 5DPH |
| Hand | 229 | 41 | R | MTC1, MTC2, MTC3, capitatum, hamatum, scaphoid, trapeze, trapezoid, 3PPH, 3MPH, 4DPH |
| Hand | 240 | 11 | R | Complete |
| Finger | 240 | 74 | L | MTC2, PPH |
| Finger | 50088 | 71 | L | MTC2, MTC3, 2PPH, 2MPH, 2DPH |
| Finger | 240 | 28 | L | MTC5, PPH |
| Finger | 203 | - | R | MTC5, PPH |
| Carpal bones | 240 | 6 | L | Capitatum, hamatum |
| Carpal bones | 226 | 23 | L | Capitatum, hamatum, trapezoid |
| Finger | 240 | 69 | | MTC4, PPH |
| Finger | 88 | – | | PPH, MPH, DPH, distal epiphysis of MTC |
| Finger | 226 | – | | 2 MPH mummified with 2DPH |
| Finger | 229 | – | | MPH, PPH |
| Finger | 88 | – | – | PPH, MPH, DPH, distal epiphysis of immature MTC |
| Spine | 124 | | | Cervical and thoracic vertebrae, left clavicle and scapula |
| Vertebra | 226 | 32-31-36 | | TV10-TV11-TV12-LV1-LV2 |
| Sacrum | 83 | 35 | | Sacrum, coccyx |
| Sacrum | 226 | 22 | | Sacrum, coccyx, LV5 |
| Sacrum | 240 | 40 | | Sacrum, coccyx |
| Femur | 170 | 17 | L | Skin |
| Femur | 170 | 14 | L | With skin |
| Femur | 226 | 7 | R | Skin |
| Femur | 168 | 14 | R | Skin |
| Femur | 168 | 10 | R | Skin |
| Tibia+fibula | 221 | 3 | L | Skin |
| Pelvis | 50240 | 84 | L | Skin |
| Pelvis | 50168 | 4 | L | Skin |
| Pelvis | 50240 | 17 | L | Skin |
| Pelvis1 | 50168 | 16 | R | Mummified with fore arm 15 |
| Foot | 240 | 41 | L | Lateral cuneiform, cuboid, MTT4, MTT5 |
| Calcaneum | 88 | | R | Skin |
| Foot | 106 | – | L | Medial cuneiform, intermediate cuneiform, MTC1, MTC2, MTC3, PPF, MPF, DPF |
| Foot | 226 | – | R | MTT1, PPF1, DPF1 |
| Foot | 235 | 1 | R | MTT2, MTT3, phalange |

Appendix 4

Chart 1 : MNI adults in tomb IGN 117

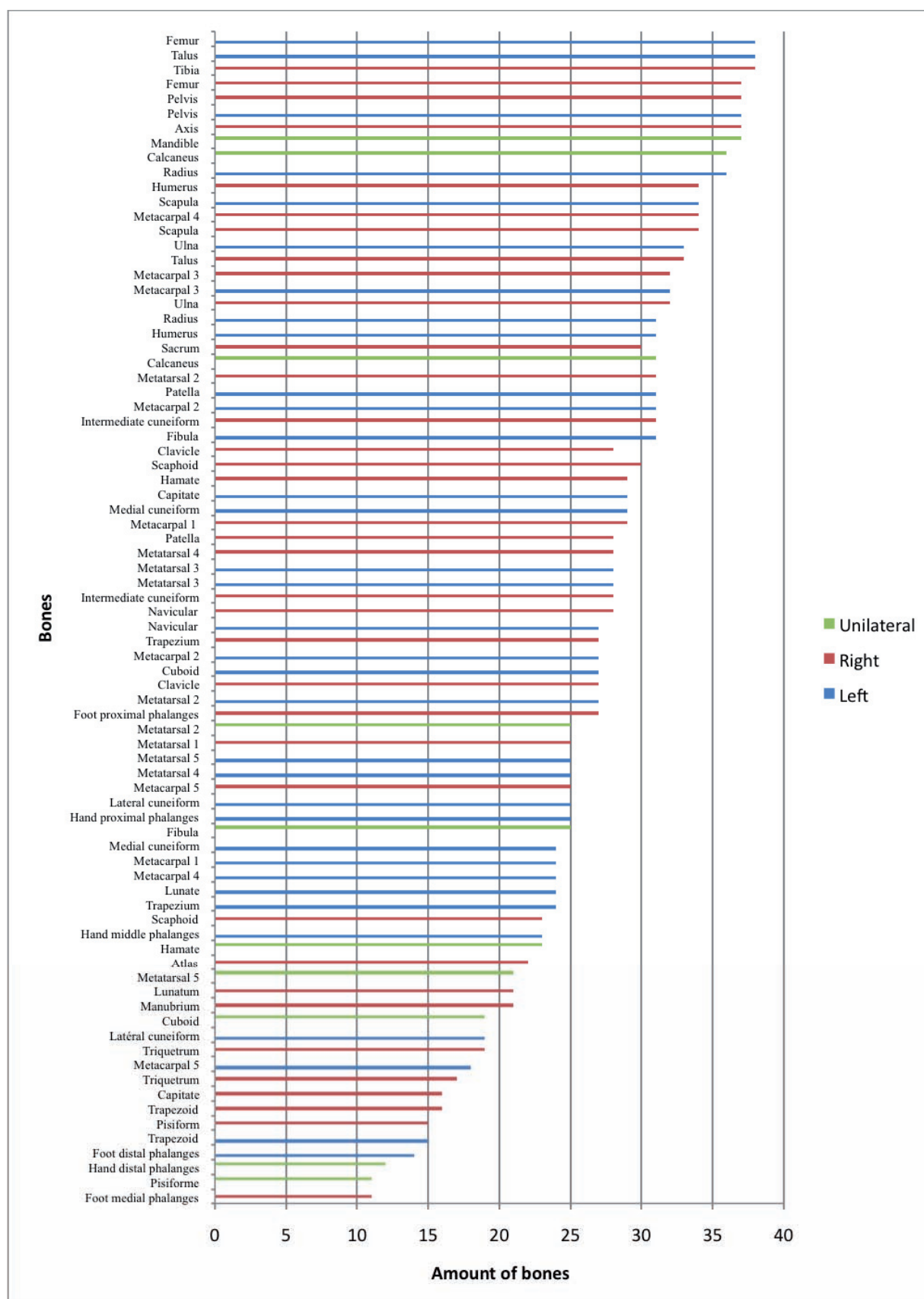


Chart 2 : MNI adults Area A

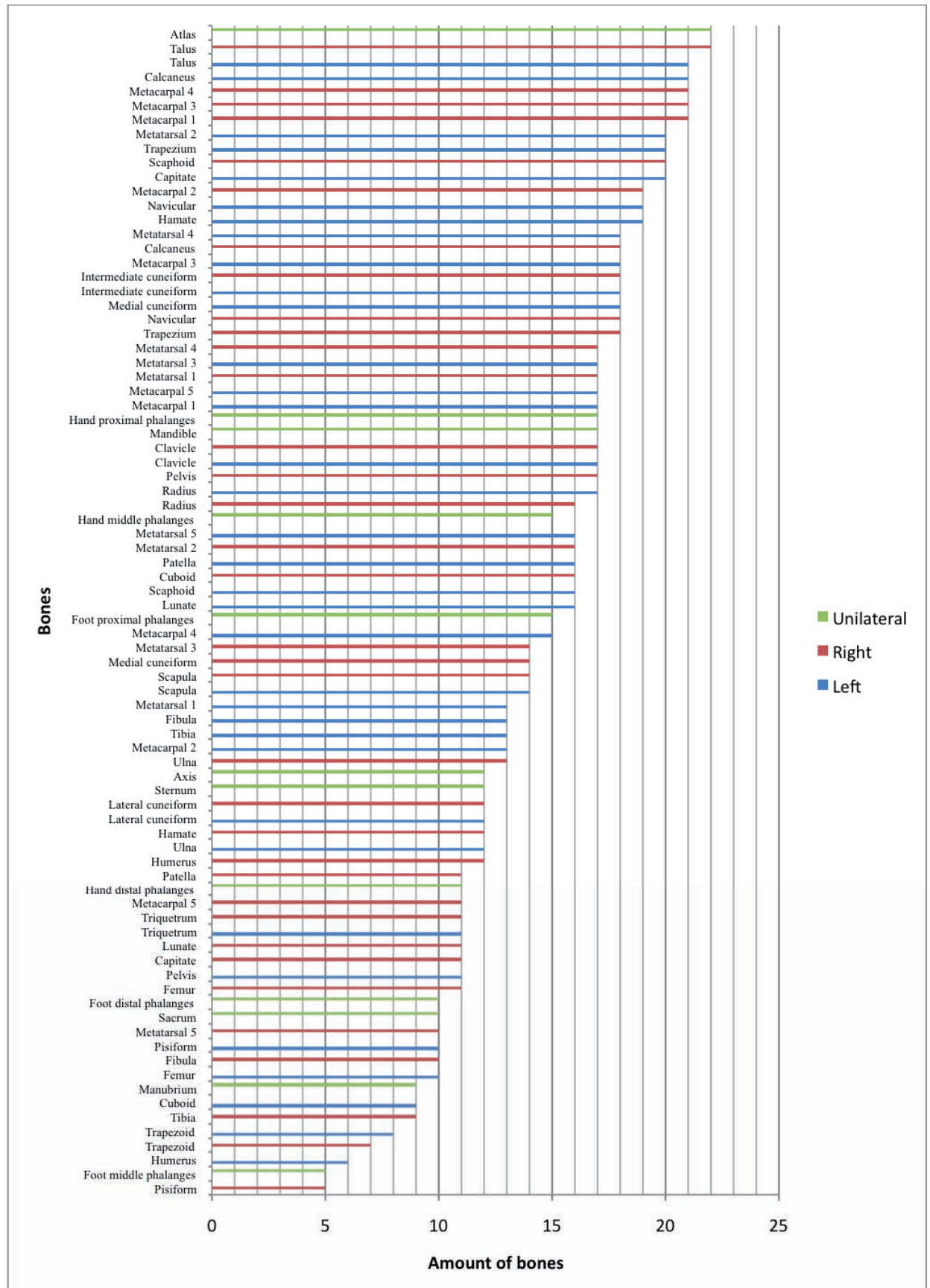


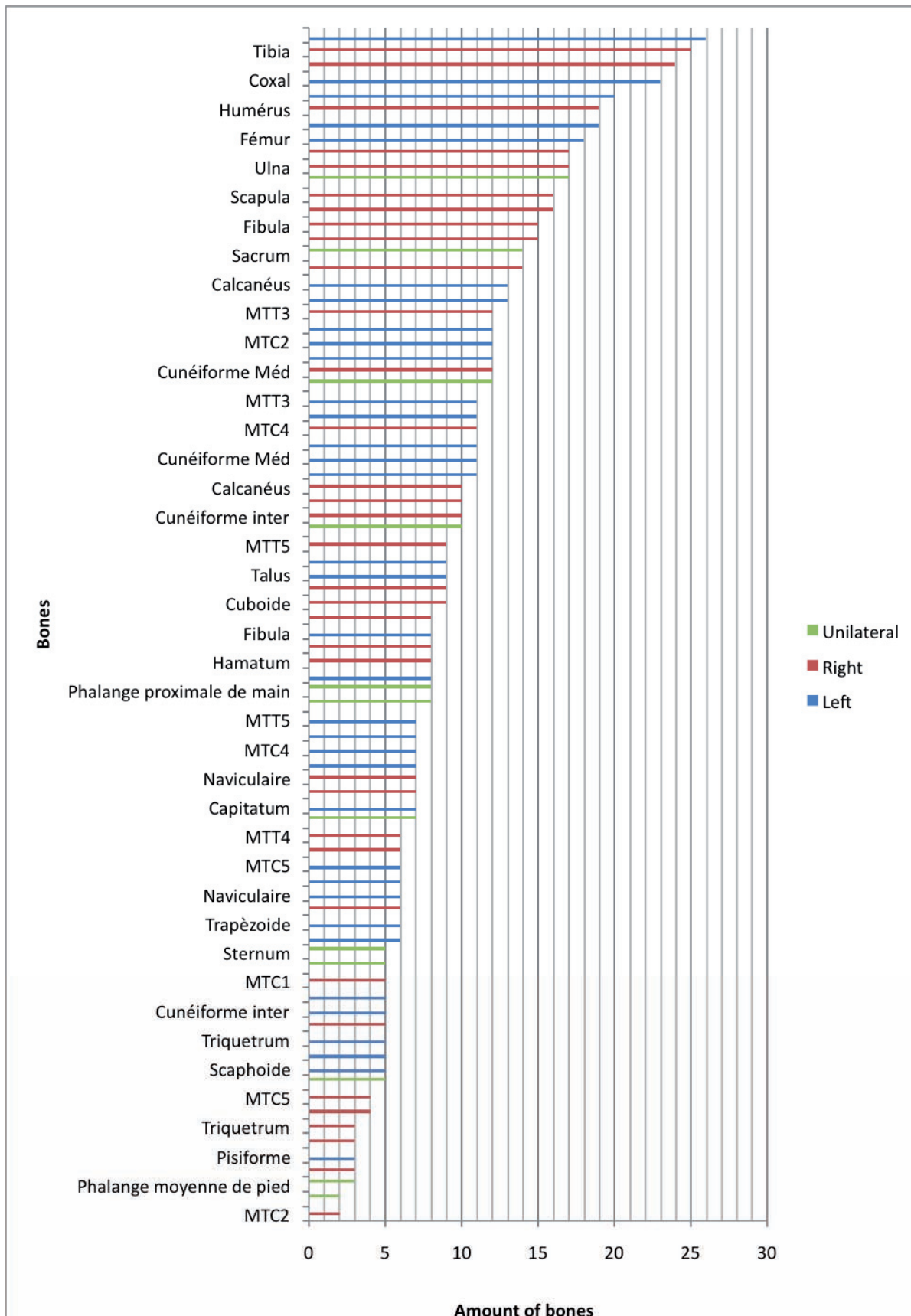
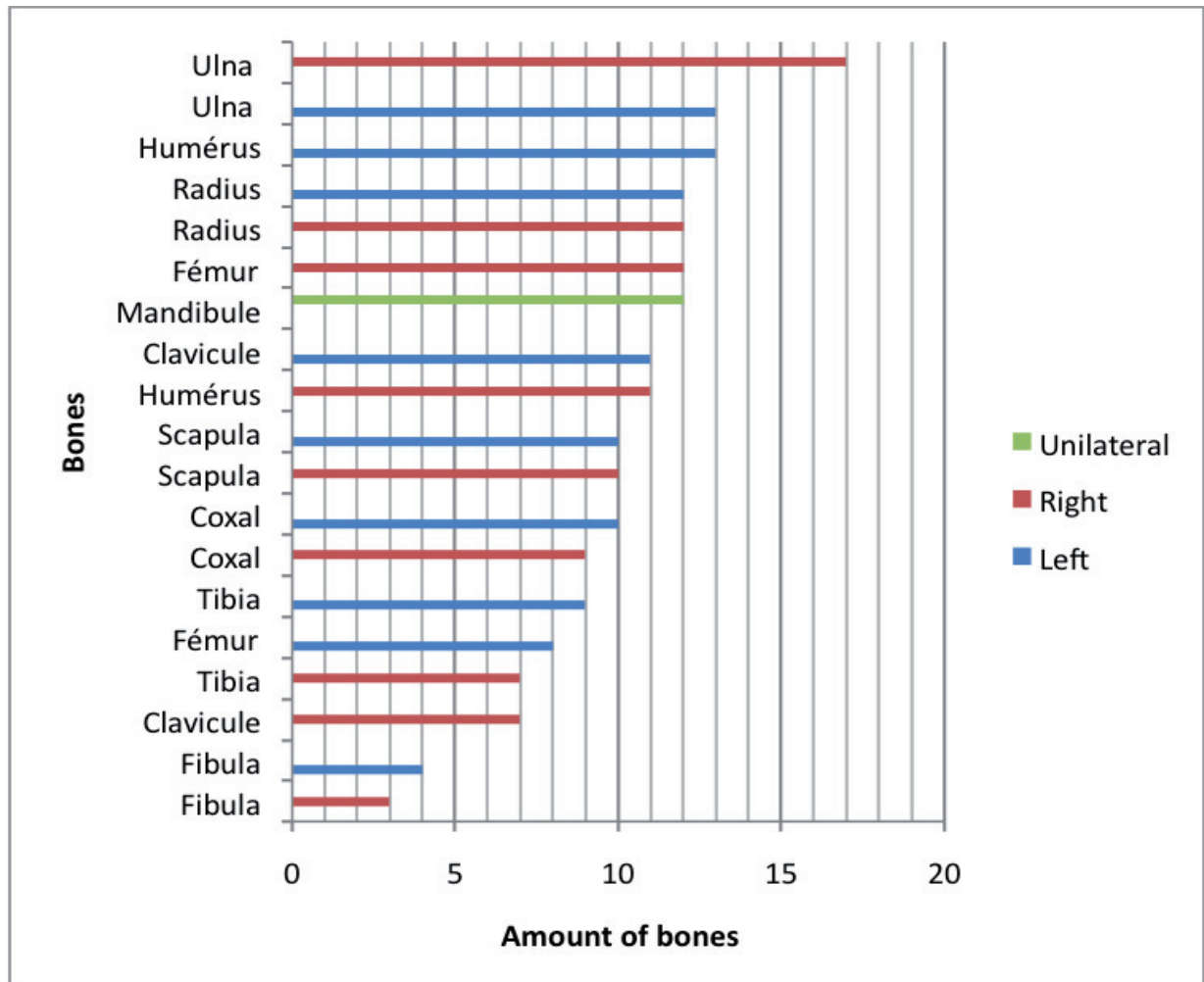
Chart 3 : MNI adults Area B

Chart 4 : MNI children

Appendix 5. Diagnosis of sex and age estimates for right pelvis bones

| <i>Locus</i> | <i>N°</i> | <i>Area</i> | <i>Side</i> | <i>Using morphology (Bruzek 1991)</i> | <i>Using probability (Murail 2005)</i> | | | <i>Sex</i> | <i>Age</i> | <i>Pairing</i> |
|--------------|-----------|-------------|-------------|---------------------------------------|--|----------|------------------------|------------|------------|---|
| | | | | | <i>F</i> | <i>M</i> | <i>Probable gender</i> | | | |
| 50083 | 46 | ND | R | I | 0.00 | 1.00 | M | M | 30-39 | |
| 50090 | 4 | ND | R | I | 0.00 | 1.00 | M | M | 30-39 | |
| 50090 | 14 | ND | R | I | 0.00 | 1.00 | M | M | > 30 | |
| 50090 | 20 | ND | R | I | 0.00 | 1.00 | M | M | 30-49 | 50090-14 and 50090-20 |
| 50232 | 37 | ND | R | I | 0.00 | 1.00 | M | M | 20-29 | |
| 50232 | 11 | ND | R | M | 0.00 | 1.00 | M | M | 30-49 | |
| 50166 | 21 | IS | R | M | 0.01 | 0.99 | M | M | 30-39 | |
| 50176 | 18 | IS | R | M | 0.01 | 0.99 | M | M | 30-39 | 50176-14 and 50176-18 |
| 50176 | 6 | IS | R | M | 0.00 | 1.00 | M | M | 30-39 | |
| 50187 | 17 | IS | R | I | 0.04 | 0.96 | M | M | 30-39 | |
| 50199 | 4 | IS | R | M | 0.04 | 0.96 | M | M | 30-49 | |
| 50206 | 8 | IS | R | M | 0.00 | 1.00 | M | M | 30-49 | |
| 50228 | 1 | IS | R | M | 0.03 | 0.97 | M | M | 30-49 | |
| 50088 | 64 | ND | R | I | 0.96 | 0.04 | F | F | | |
| 500?? | 83 | ND | R | F | 0.77 | 0.23 | I | F | 30-59 | |
| 50090 | 11 | ND | R | I | 0.99 | 0.01 | F | F | 30-39 | |
| 50229 | 14 | ND | R | F | 1.00 | 0.00 | F | F | 30-49 | |
| 50165 | 27 | IS | R | I | 1.00 | 0.00 | F | F | > 30 | |
| 50168 | 16 | ND | R | F | 0.26 | 0.74 | I | F | > 30 | With arm 50168-15 |
| 50166 | 26 | IS | R | F | | | F | F | 20-29 | |
| 50176 | 11 | ND | R | F | 1.00 | 0.00 | F | F | 30-49 | |
| 50176 | 23 | ND | R | F | 1.00 | 0.00 | F | F | > 30 | |
| 50211 | | IS | R | F | 0.98 | 0.02 | F | F | 20-29 | |
| 50083 | C1 | ND | R | I | 0.11 | 0.89 | I | I | < 60 | |
| 50170 | 26 | ND | R | I | 0.59 | 0.41 | I | I | 30-49 | |
| 50229 | 13 | IS | R | I | – | – | I | I | 20-39 | |
| 50240 | 26 | ND | L | I | 0.96 | 0.04 | F | F | 15-19 | With femur 50240-27, tibia 50226-56 and pelvis 50240-43 |
| 50240 | 43 | ND | R | I | 0.89 | 0.11 | I | I | 15-19 | With femur 50226-35, tibia 50226-58 and pelvis 50240-26 |

Appendix 6. Diagnosis of sex and age estimates for left pelvis bones

| <i>Locus</i> | <i>Nº</i> | <i>Area</i> | <i>Side</i> | <i>Using morphology (Bruzek 1991)</i> | <i>Using probability (Murail 2005)</i> | | | <i>Sex</i> | <i>Age</i> | <i>Pairing</i> |
|--------------|-----------|-------------|-------------|---------------------------------------|--|-------------|------------------------|------------|----------------|-----------------------|
| | | | | | <i>Female</i> | <i>Male</i> | <i>Probable gender</i> | | | |
| 50094 | 26 | ND | L | I | 0.00 | 1.00 | M | M | > 30 | |
| 50081 | | ND | L | I | 0.02 | 0.98 | M | M | 30-39 | |
| 50082 | A1 | ND | L | I | 0.00 | 1.00 | M | M | 30-49 | |
| 50232 | 13 | ND | L | I | 0.02 | 0.98 | M | M | > 30 | |
| 50240 | 84 | ND | L | M | 0.00 | 1.00 | M | M | > 30 | |
| 50165 | 16 | IS | L | M | 0.02 | 0.98 | M | M | 30-49 | |
| 50165 | 23 | IS | L | M | 0.52 | 0.48 | I | M | 30-39 | |
| 50176 | 14 | IS | L | M | 0.01 | 0.99 | M | M | > 30 | 50176-14 and 50176-18 |
| 50178 | 4 | IS | L | I | 0.00 | 1.00 | M | M | > 30 | |
| 50219 | | IS | L | M | 0.00 | 1.00 | M | M | 30-39 | |
| 50228 | 3 | IS | L | M | 0.52 | 0.48 | I | M | 30-49 | |
| 50219 | 6 | IS | L | M | 0.14 | 0.86 | I | M | 30-49 | |
| 50199 | 13 | IS | L | I | 0.01 | 0.99 | M | M | 30-49 | |
| 50132 | 9 | IS | L | F | 1.00 | 0.00 | F | F | 30-39 | |
| 50168 | 4 | ND | L | F | 1.00 | 0.00 | F | F | 30-49 | |
| 50165 | 24 | IS | L | F | 1.00 | 0.00 | F | F | > 30 | |
| 50165 | 12 | IS | L | F | 1.00 | 0.00 | F | F | 30-39 | |
| 50178 | 15 | IS | L | I | 1.00 | 0.00 | F | F | 30-49 | |
| 50199 | 5 | IS | L | F | 0.99 | 0.01 | F | F | 30-39 | |
| 50211 | | IS | L | F | 1.00 | 0.00 | F | F | 20-29 | |
| 50240 | 17 | ND | L | F | 0.21 | 0.79 | I | F | > 30 | |
| 50090 | 13 | ND | L | I | - | - | I | I | 30-49 | |
| 50083 | | ND | L | I | - | - | I | I | > 40 | |
| 50175 | 15 | ND | L | I | - | - | I | I | > 50 | |
| 50106 | | ND | L | I | - | - | I | I | 30-49 | |
| 50165 | 13 | IS | L | I | 0.90 | 0.10 | I | I | 30-49 | |
| 50176 | 22 | IS | L | I | 0.13 | 0.87 | I | I | > 40 | With femur 50176-2 |
| 50204 | 16 | IS | L | I | 0.86 | 0.14 | I | I | > 40 | |
| 50249 | 4 | IS | L | I | - | - | I | I | > 30 | |
| 50249 | 5 | IS | L | I | - | - | I | I | > 30 | |

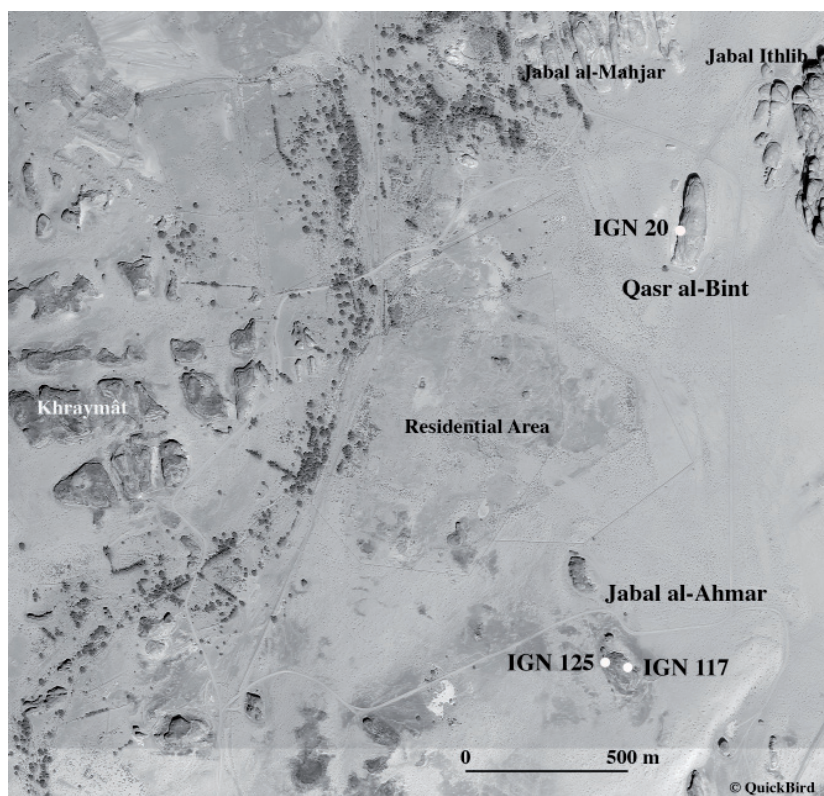


Fig. 1 Map of tombs excavated in Hegra



Fig. 2 Tomb IGN 20, cut in the western cliff of the massif known as Qasr al-Bint



Fig. 3 Primary burial 50068 in tomb IGN 20



Fig. 4 Red cloth wrapping burial 50068



Fig. 5 Tomb IGN 117

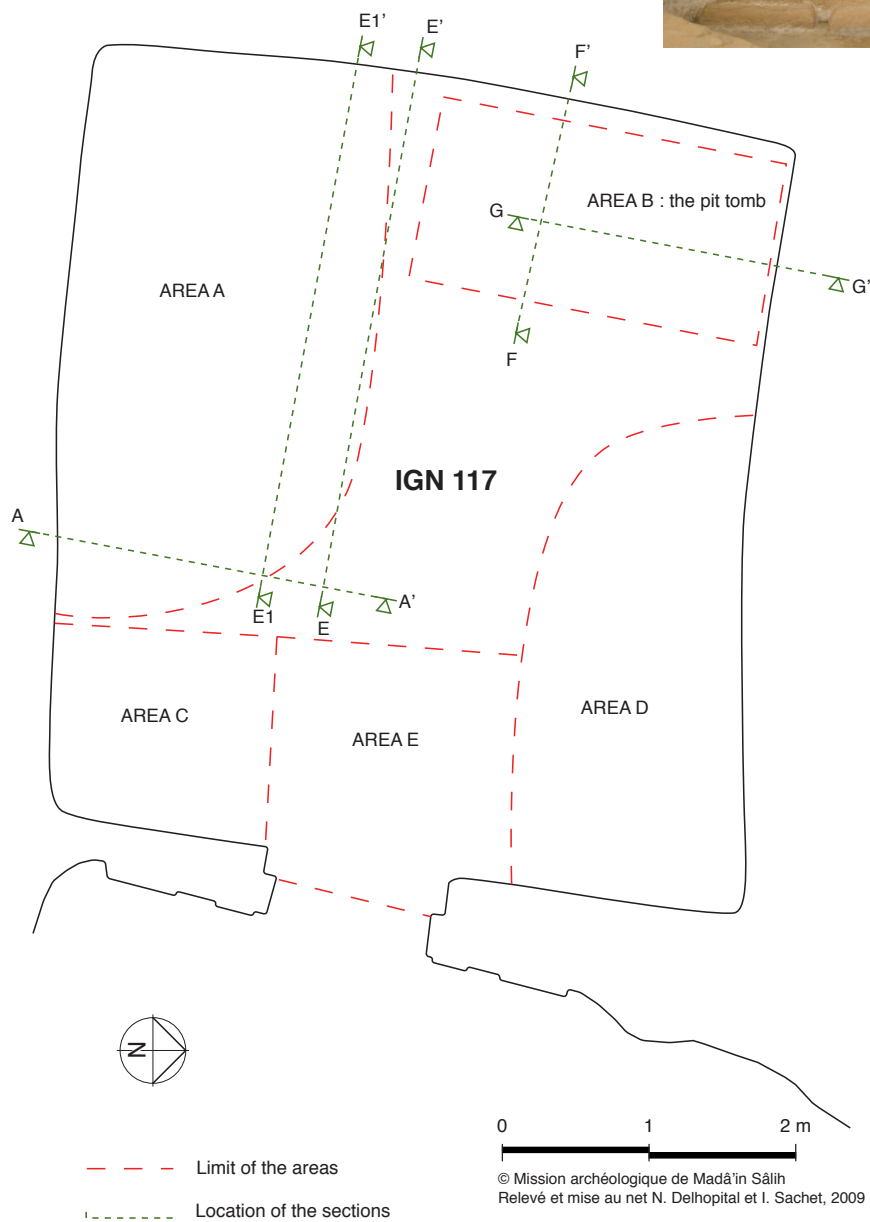


Fig. 6 Plan of excavated areas in tomb IGN 117



Fig. 7 Wooden box



Fig. 8 Residue on skull



Fig. 9 Cloth wrapping the individuals in area C



Fig. 10 Leather (50240_L11) found in tomb IGN 117



Fig. 11 Wooden plank (50240_W01) found in tomb IGN 117

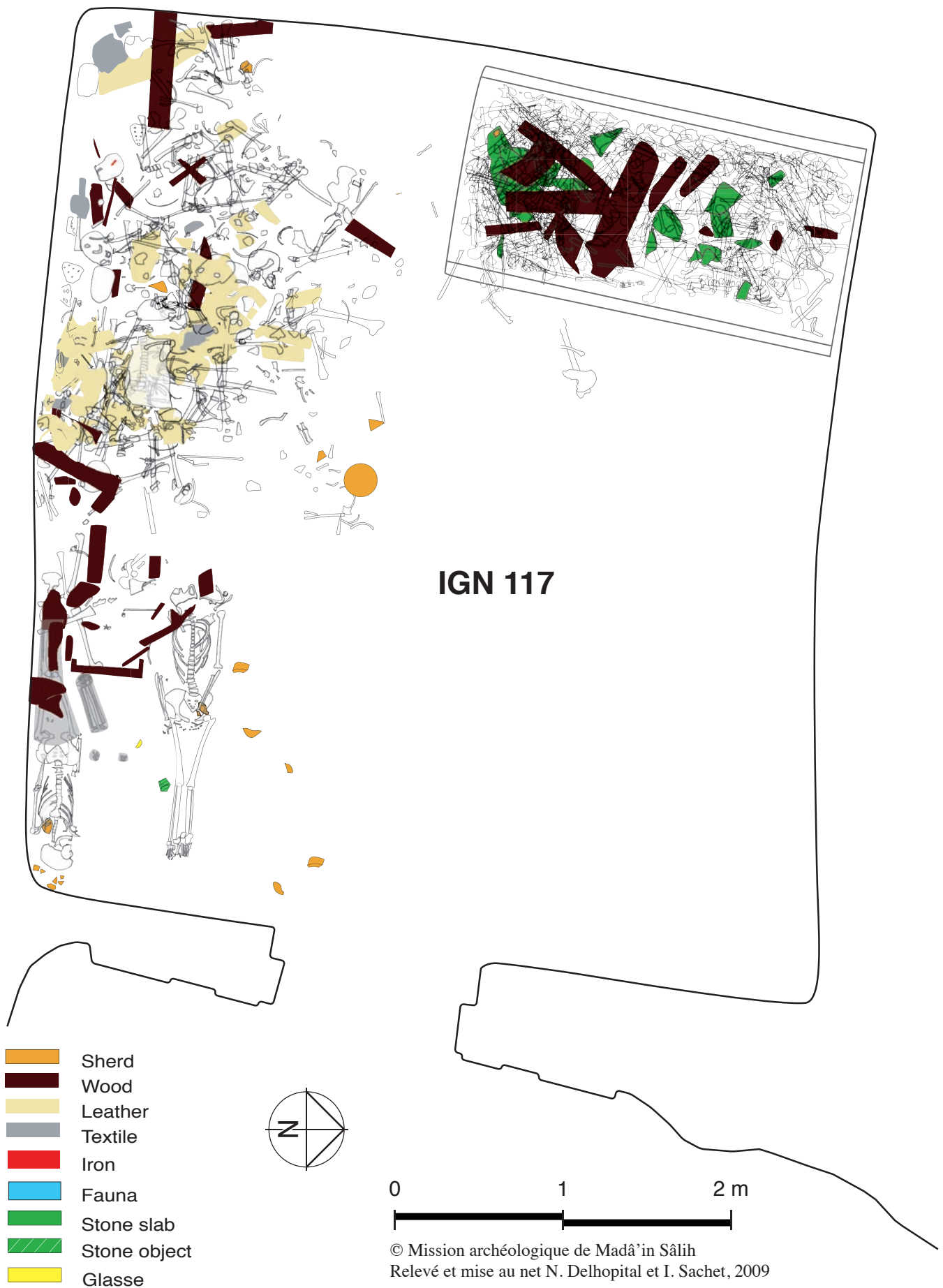


Fig. 12 Archaeological material found in tomb IGN 117



Fig. 13 Spear point (50106_M01) found in *locus* 50106



Fig. 14 Rope (50168_T01) found in *locus* 50168

Section E1-E1'
(not excavated in 2009)

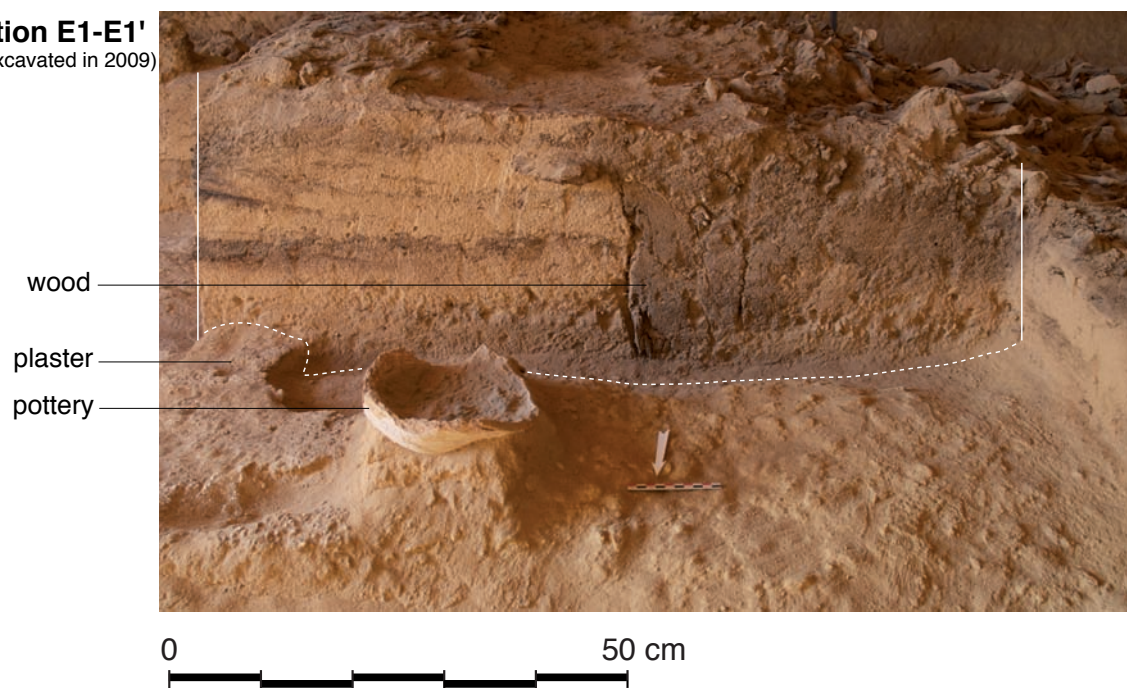


Fig. 15 Section E1-E1'



Fig. 16 Wooden peg (50134_W01) found in *locus* 50134

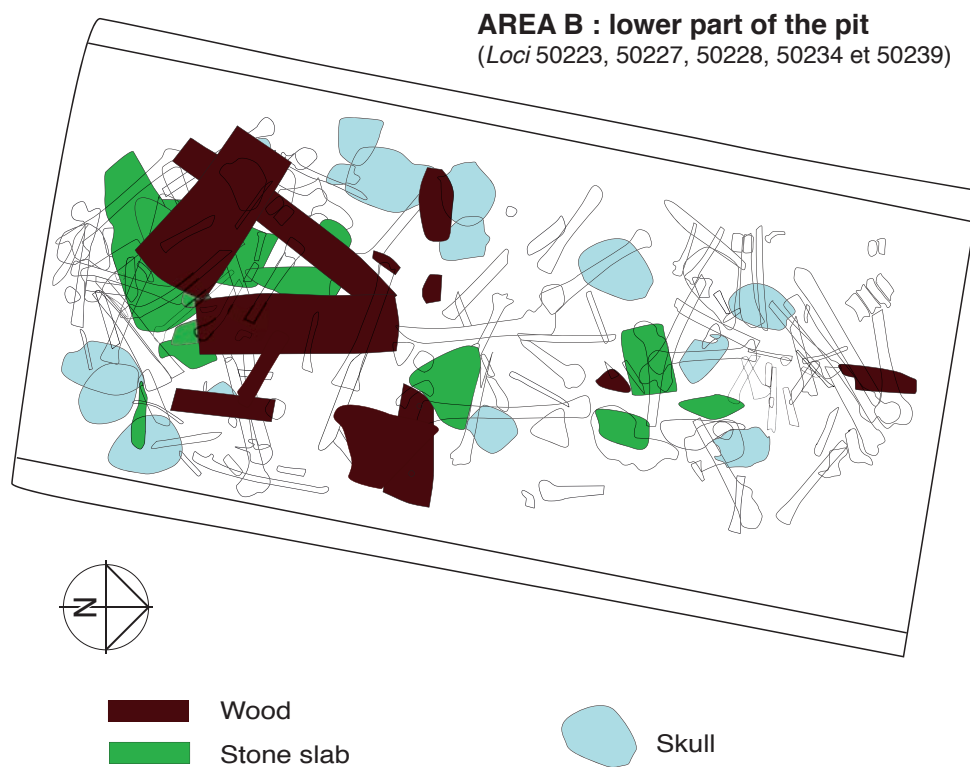


Fig. 17 Lower part of the pit tomb, degraded archaeological material

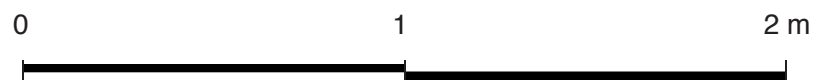


Fig. 18 Individuals found *in situ* in pit tomb (area B)

Fig. 19 Archaeological material from the pit tomb (area B)



Chronological sequence: 1/ skulls, 2/ slabs, 3/ wood



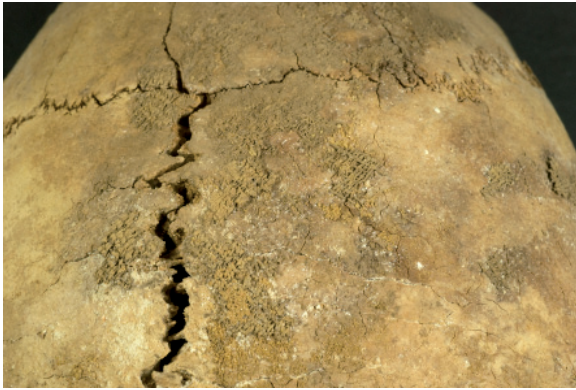


Fig. 20 Textiles (50219_B01) stuck to the skull in the pit tomb (area B)



Fig. 22 Iron ring on the hand of individual 50238



Fig. 21 Bronze ring, *locus* 50223

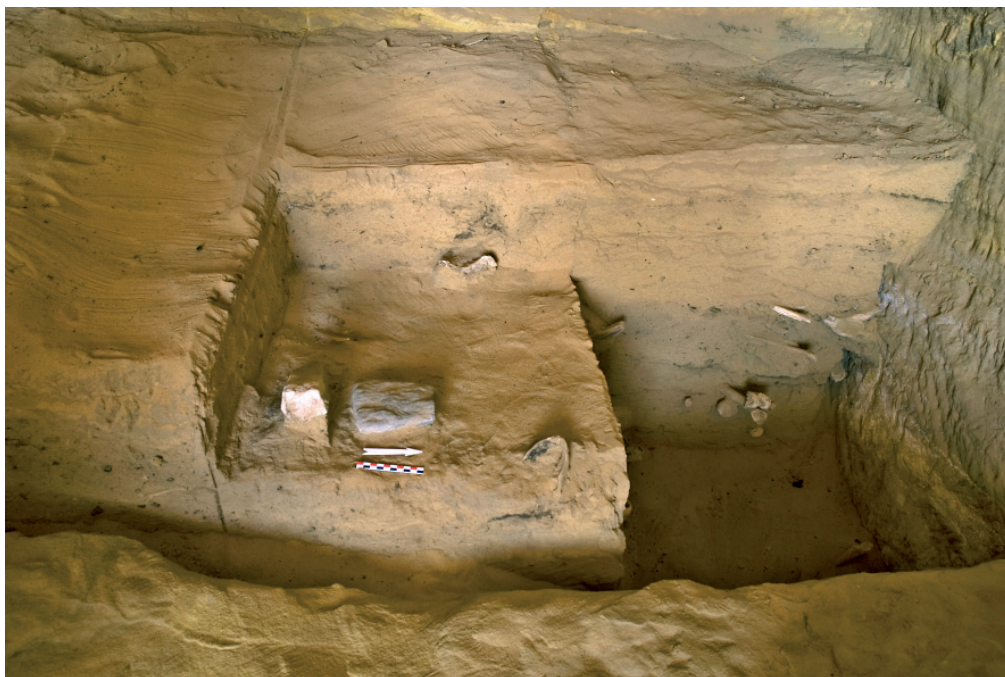


Fig. 23 Fill of the pit tomb

Section G-G'

1. sand, few bones
2. sand, wood, numerous bones

slab

wood

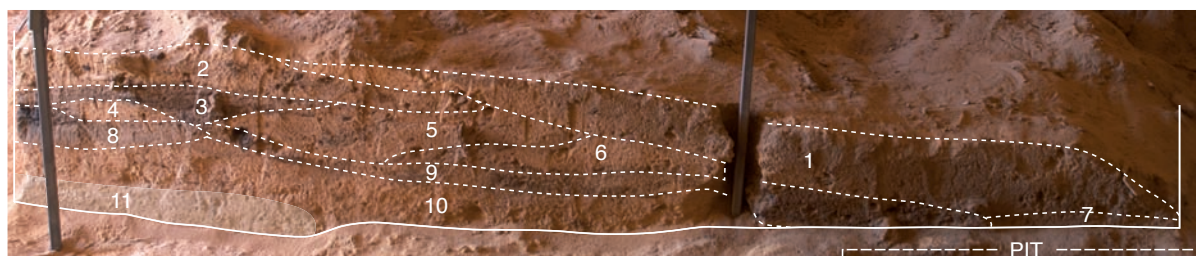


Fig. 24 Section GG'

Section F-F'Sloping
east/west

groove

Fig. 25 Section FF'



0 50 cm

© Mission archéologique de Madâ'in Sâlih
Relevé et mise au net N. Delhopital et I. Sachet, 2009

**Section E-E'**

1. Locus 50205: sand, wood
2. Locus 50210: sand, textile
3. Locus 50213: sand, bone, wood
4. No number
5. Locus 50214: sand, wood, bone
6. Locus 50217: sand
7. No number
8. No number
9. Locus 50216: sand, wood
10. Locus 50218: sand
11. Plaster

Fig. 26 Section EE'



Fig. 27 Doorway of tomb IGN 117



Fig. 28 Preserved courses of the second system of closing the doorway



Fig. 29 Nabataean jug with incised lines, 50120_P01



Fig. 30 Glazed Parthian jug, 50110_P01



Fig. 31 Stone dish with compartments, 50111_S01



Fig. 32 Small bronze bell with iron clapper, 50120_M01

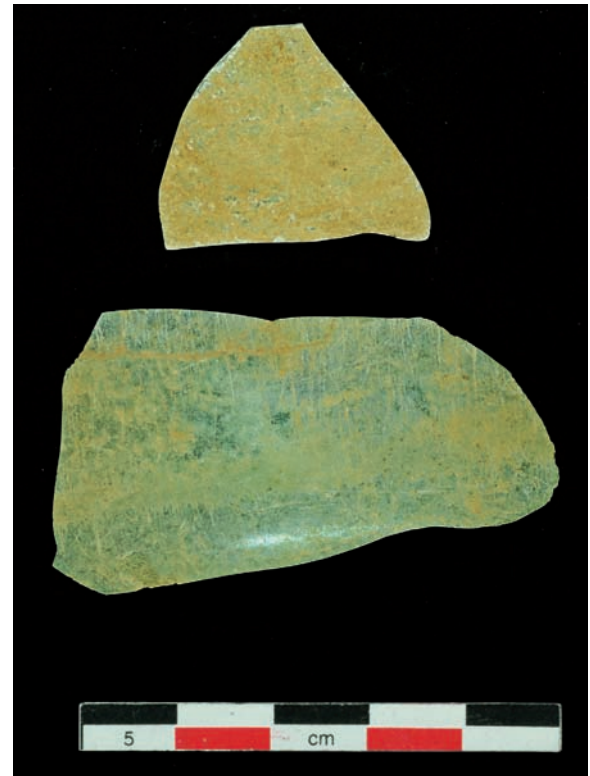


Fig. 33 Fragments of a glass vase,
50111_G01

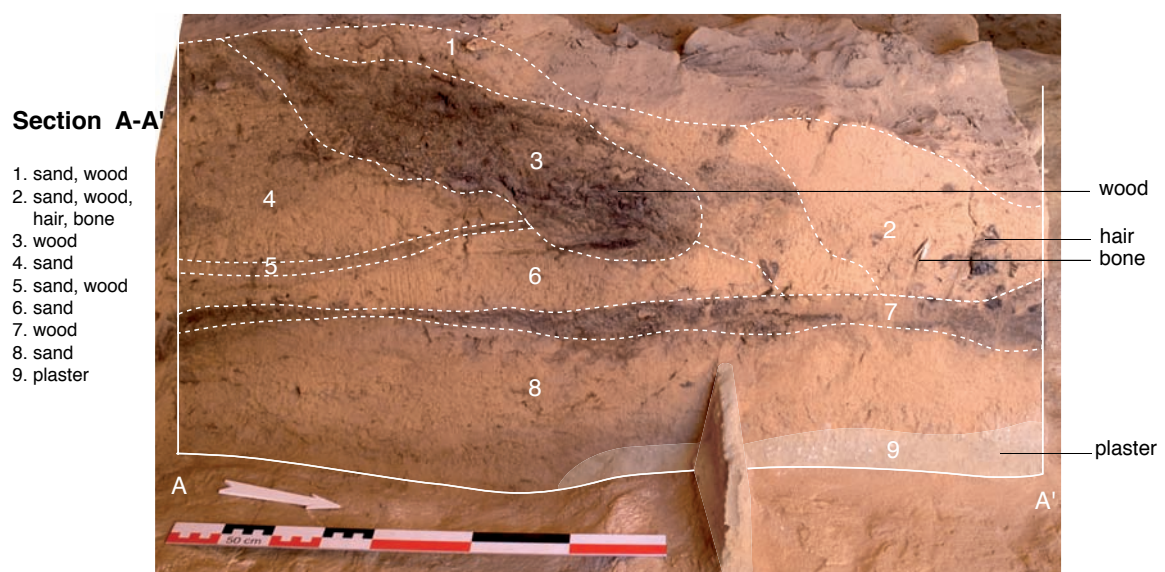


Fig. 34 Section AA'



Fig. 35 Mummified spinal column, 50124_B01



Fig. 36 Mummified hand, 50226_B08



Fig. 37 Individuals *in situ* in the southeast corner of tomb IGN 117, area C (from right to left, individuals 50085, 50086, 50087).

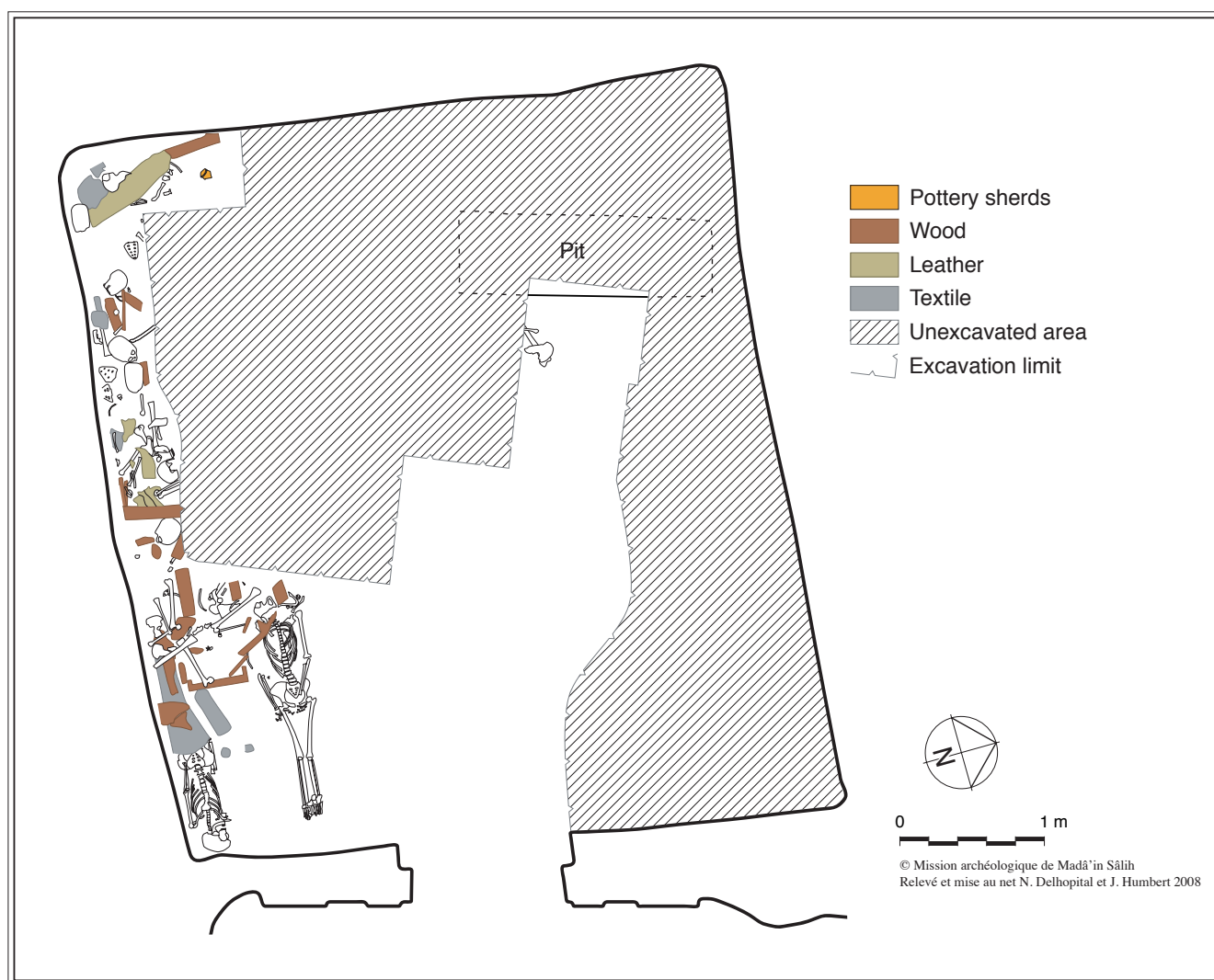


Fig. 38 Individuals *in situ* in the southeast corner of tomb IGN 117, area C

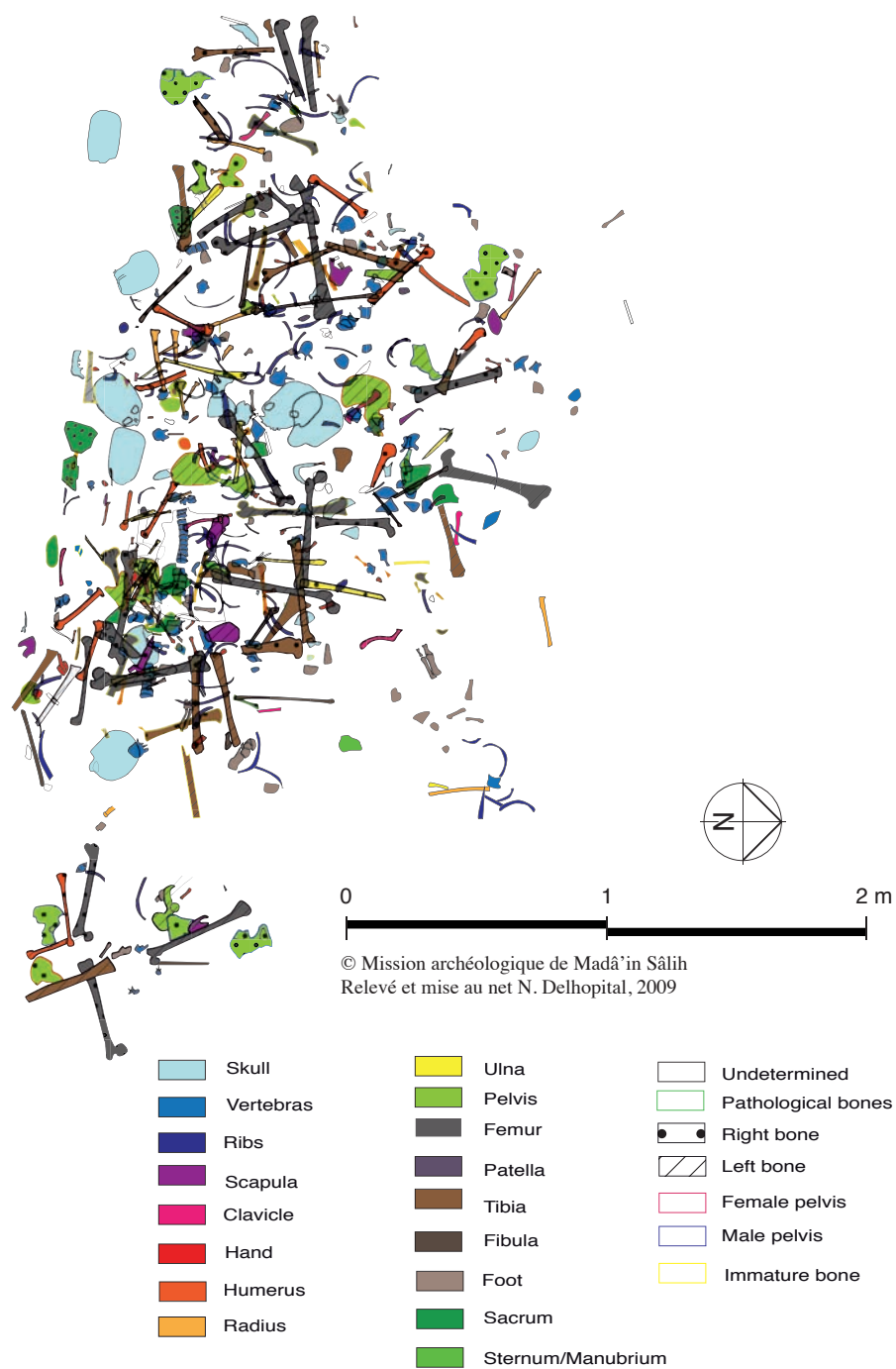


Fig. 39 Bones found in area A

Fig. 40 Articulated legs found in area A (*locus* 50226)

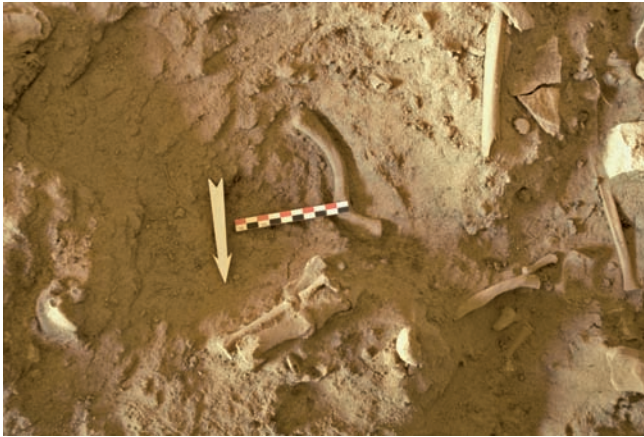


Fig. 41 Articulated foot found in area A, *locus* 50170 ,

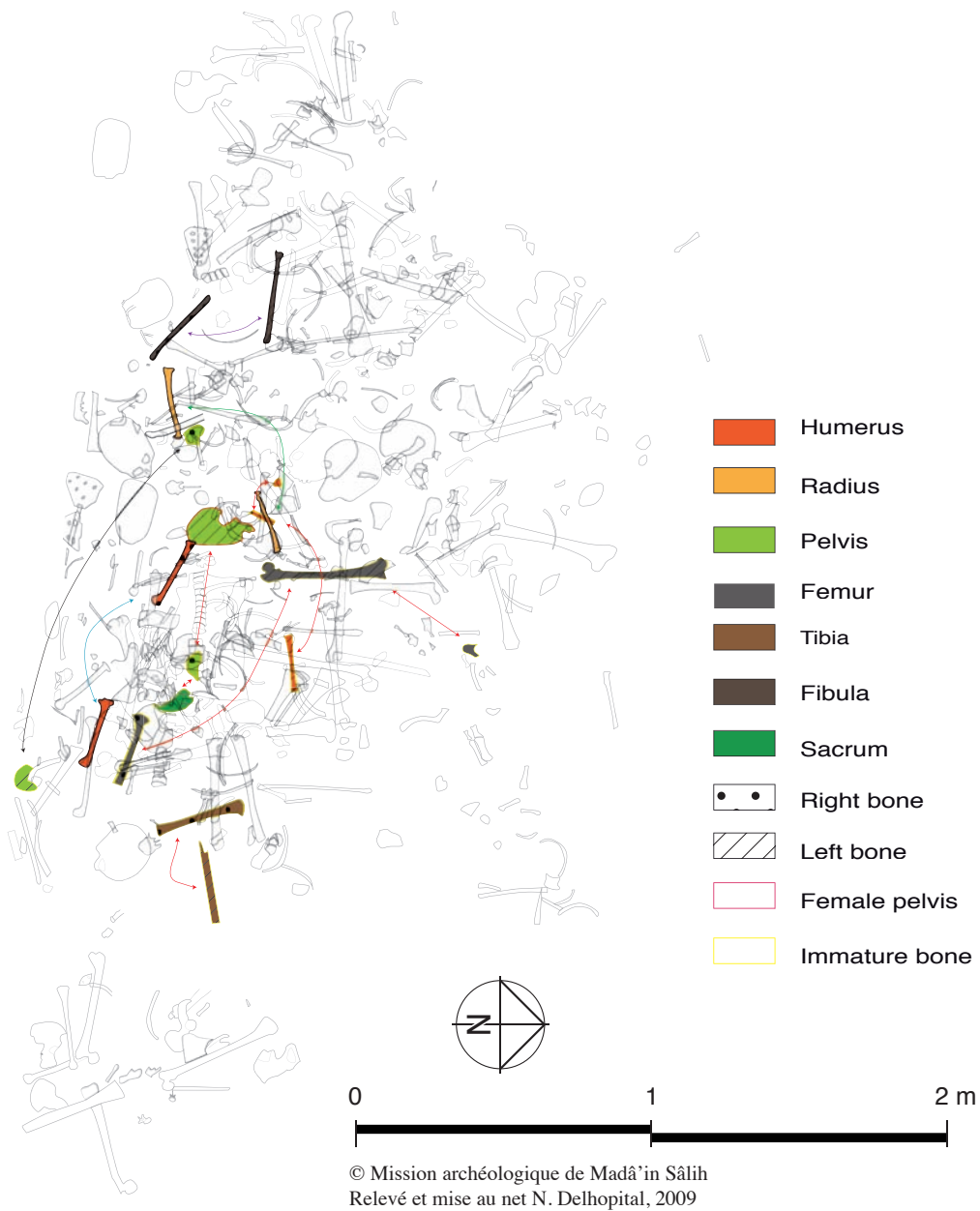
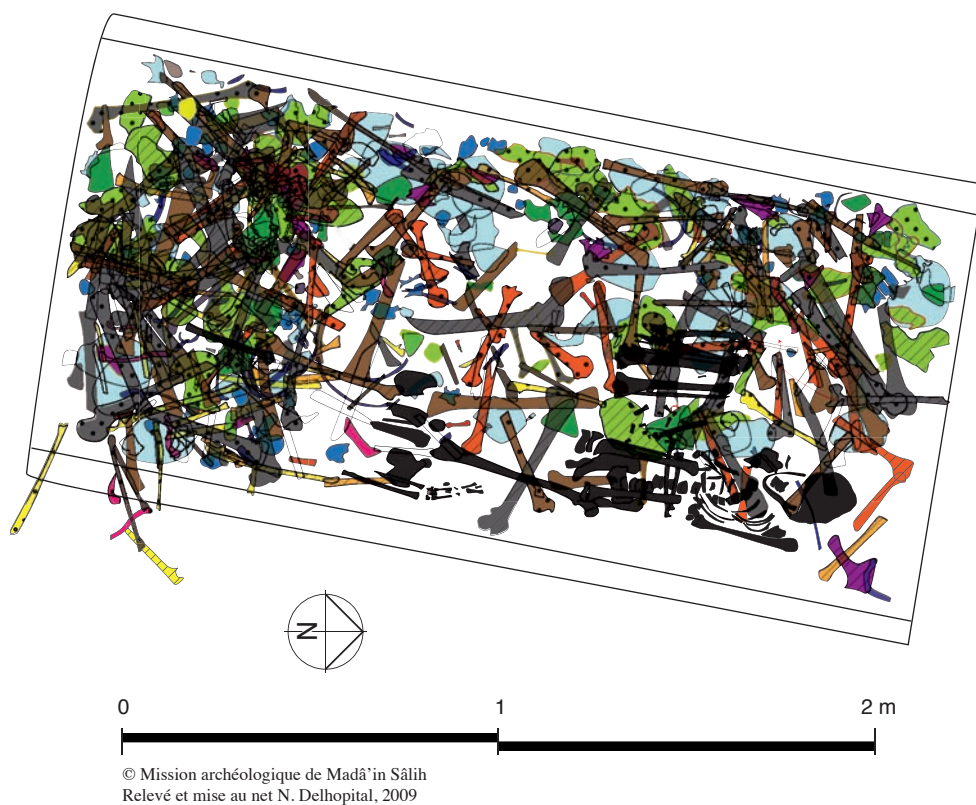


Fig. 42 Bones that might belong to the same individuals



Fig. 43 Bones found mixed up in the pit tomb, area B



| | | | | | |
|--|-----------|--|-------------------|--|---------------------|
| | Skull | | Ulna | | Undetermined |
| | Vertebrae | | Pelvis | | Pathological bone |
| | Ribs | | Femur | | Right bone |
| | Scapula | | Patella | | Left bone |
| | Clavicle | | Tibia | | Female pelvis |
| | Hand | | Fibula | | Male pelvis |
| | Humerus | | Foot | | Immature bone |
| | Radius | | Sacrum | | In situ individuals |
| | | | Sternum/Manubrium | | |

Fig. 44 Bones found in the pit tomb, area B

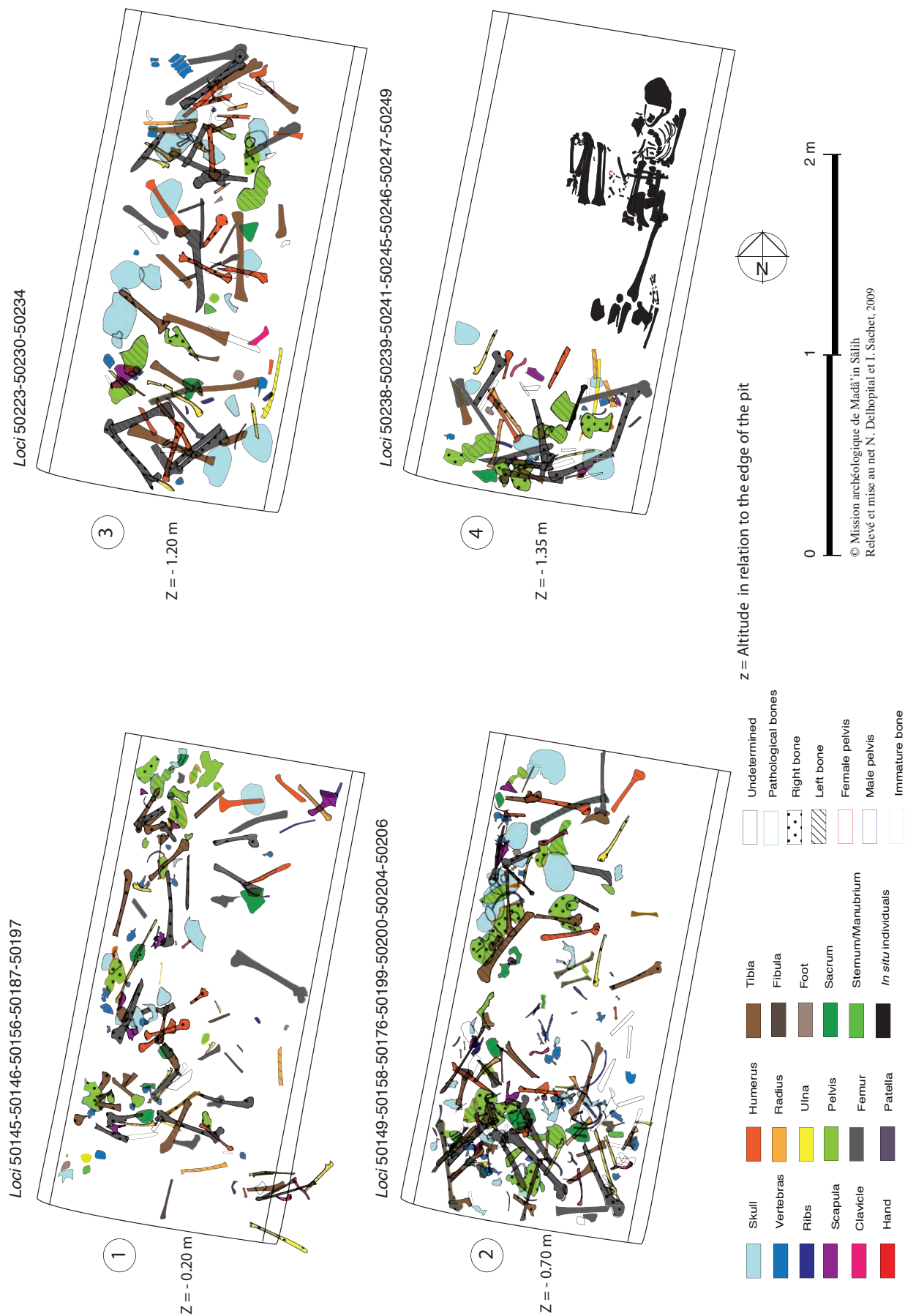


Fig. 45 Bone found in the pit tomb, according to depth, area B

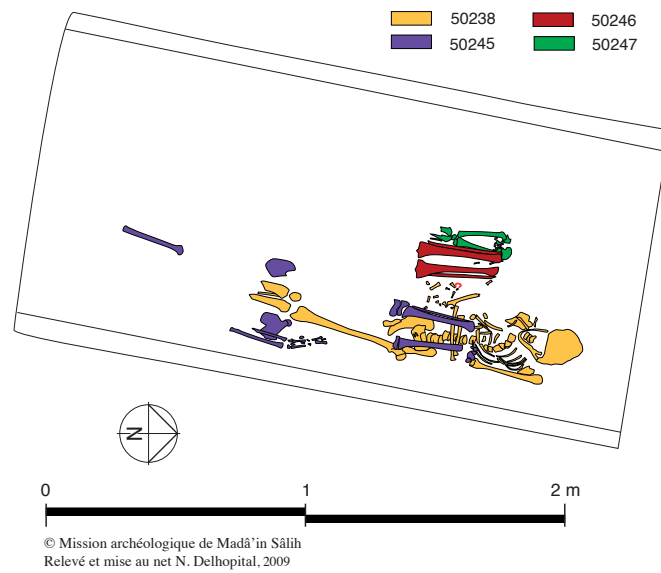
Fig. 46 Individuals found “*in situ*” in the pit tomb

Fig. 47 Individual 50238



Fig. 48 Individual 50247



Fig. 49 Pelvis of individual 50247



Fig. 50 Individual 50246

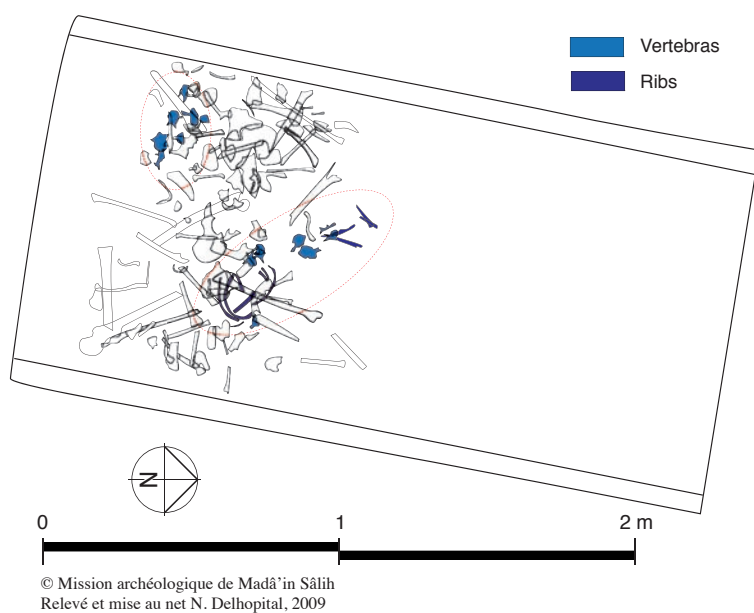


Fig. 51 Gathering of bones, vertebrae and ribs in the southern part of the pit tomb (*loci* 50199, 50200 and 50204)

Fig. 52 Articulated bones found in the pit tomb

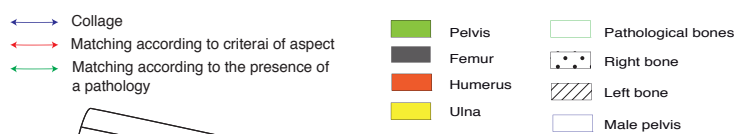
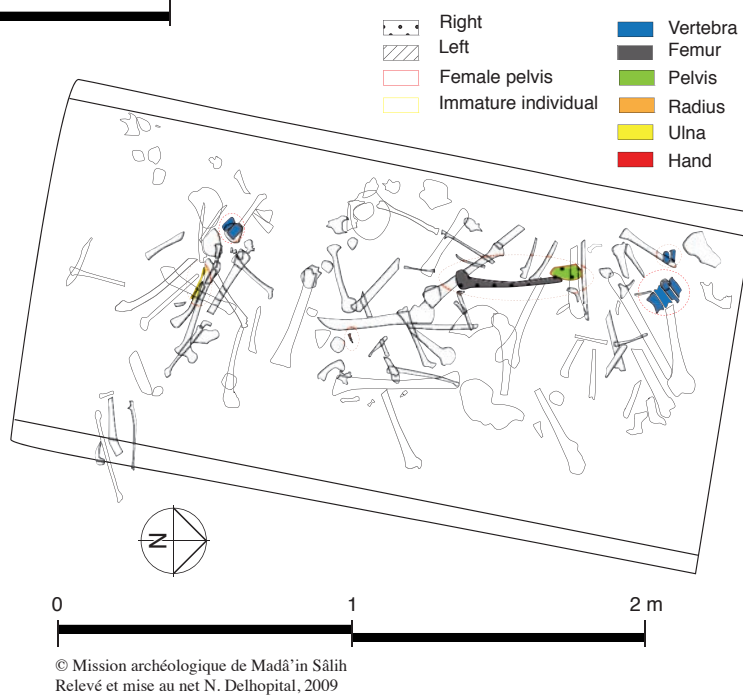


Fig. 53 Joins and bones that could belong to the same individuals



Fig. 54 Sacralization of the fifth lumbar vertebra, posterior view, 50178_B02



Fig. 55 Sacralization of the fifth lumbar vertebra, anterior view, 50178_B02



Fig. 56 The bipartite anterior calcaneal facet, 50226_B03



Fig. 57 Fractured rib, 50178_B01



Fig. 58 Fracture of the distal part of an ulna, 50204_B01



Fig. 59 Spina bifida (sacrum), 50200_B02



Fig. 60 Malformation on the head of a femur,
50176_B01



Fig. 61 Skull lined up along the side of the pit tomb,
locus 50234



Fig. 62 Fragments of sandstone slabs that
subsided into the pit tomb



Fig. 63 Decomposed wooden planks
in the pit tomb

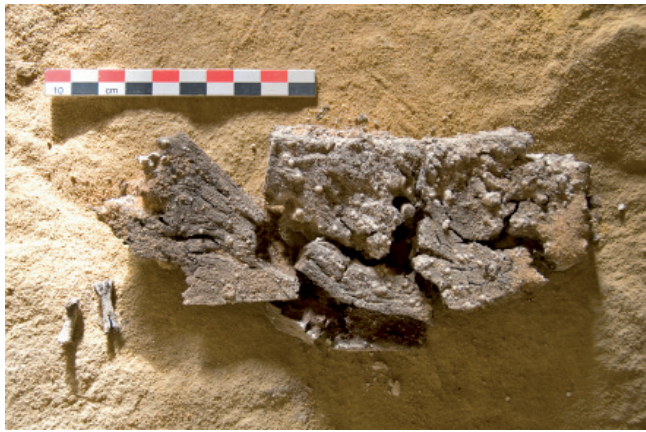


Fig. 64 Wooden peg, photographed when lifted

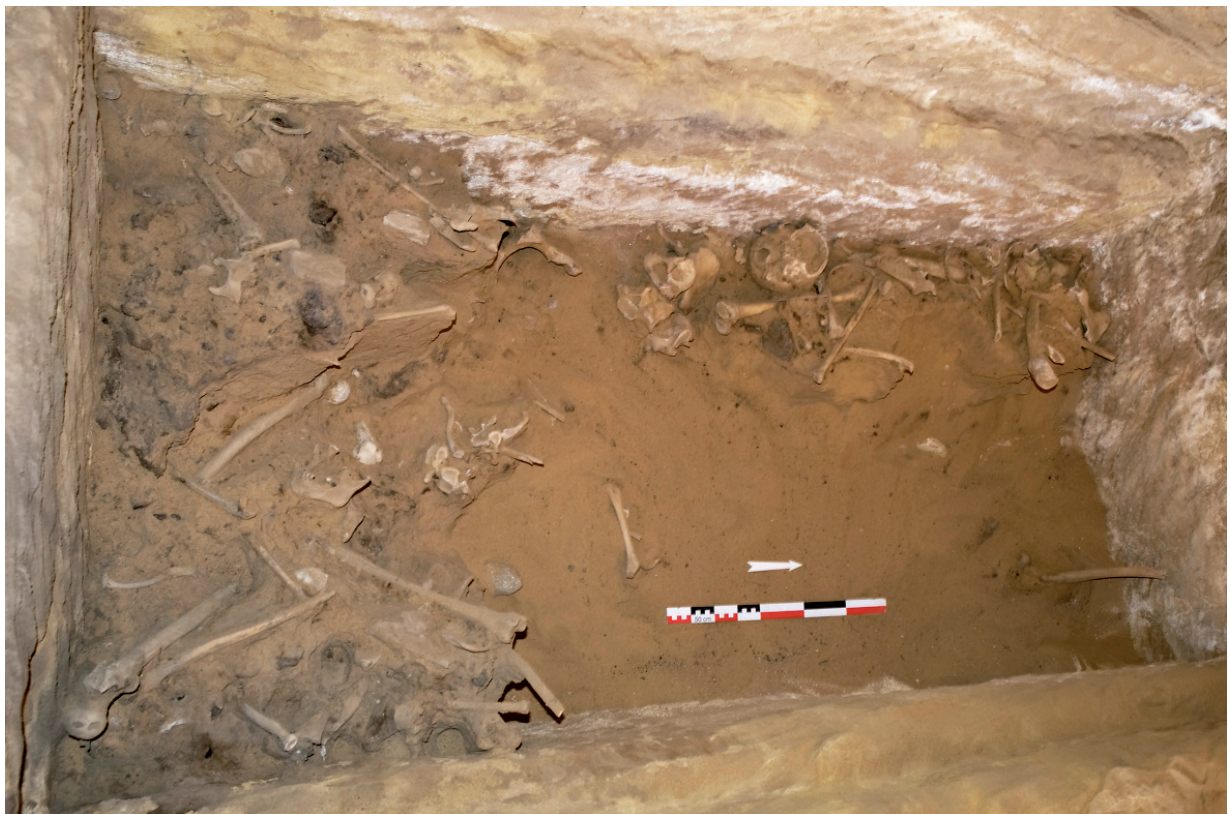


Fig. 65 Accumulation of bones in the southern part of the pit tomb, *locus* 50064



Fig. 66 Two, joined, fragments of wood in the pit tomb, *locus* 50231

Report on various trenches, Area 6

Report on various trenches, Area 6

L. Nehmé

The project put forward in 2007 to investigate the site of Hegra included a proposal to excavate several dispersed structures that had been noted during the first survey project, between 2002 and 2005. These structures stand separated from the three main groups of remains, namely the residential area, the tombs and the sanctuary zone.

Since the main sanctuaries of Jabal Ithlib had been excavated or exposed by us during the 2008 season, we decided, in 2009, to begin excavating some of these scattered structures to try, if possible, to determine their function and date.

Ith 105

The first of these structures, Ith 105, found during the initial survey season, lies in the sandy area stretching to the southwest of Jabal Ithlib,¹ on the fairly steep slope which comes down from hillock Ith 69-77 to reach the north-south track that links the police post, at the entrance to the site, with the Qasr al-Bint² (fig. 1). This is one of the areas of the site where there has been heavy accumulation of sand, recognizable by small dunes formed around bushes that trap the wind-blown sand. It is characterized by a spread of architectural blocks, mostly parts of columns – bases, drums, capitals – which seem *placed* on the sand over an area of about 110 m east to west and 50 m north to south (fig. 2). With the exception of the town, this area has produced the highest concentration of blocks belonging to a monumental building (see list of block in appendix). These blocks clearly come from a monumental complex outside the walls since the residential area and its rampart are about 500 m to the west. This complex would have dominated the town: there is about fifteen metres difference in height between its presumed location and the centre of the residential area. Almost the whole site is visible from this point, with the exception of the entrance to Jabal Ithlib, the west side of the Qasr al-Bint and a part of Jabal al-Mahjar.

¹ UTM Coordinates x 396 879 / y 296 2581. Cf. Dentzer, Kermorvant, Nehmé *et alii* 2005, p. 76.

² The westernmost block is 80 m from the track.

There were some immediate questions: does the structure related to the visible surface remains lie *below* where they were found, which would mean that the visible blocks had been *brought up* to the surface? Is it, instead, situated higher up the slope, further to the northwest, from where the blocks could have fallen? Has the structure entirely disappeared? Do the blocks come from the quarries of Jabal Ithlib?

Given that the identification of monumental structures – public buildings, temples etc. – forms part of the research on the site, we placed a sounding in what seemed to be the centre of the spread of blocks and where they were the most dense. There was also much sandstone rubble in this spot. Finally, it should be noted that some fired brick fragments were found on the surface.³ We began by setting out a 10 x 10 m square, which contained blocks no. 12, 13 and 15 (see below). An initial trench, 50 cm wide, was opened along the north side of this square and excavated to a depth of 30 cm; it produced only sand. A 2 x 2 m sounding was then opened in the northeast corner of the square and excavated to a depth of 90 cm. The fill consisted entirely of more or less homogenous aeolian sand with no trace of any archaeological material, not even a pot sherd (fig. 3). At that depth, the aeolian sand gave way to a harder surface, characterized by sand and a few water-rolled pebbles. This surface is perhaps the interface between two deposits, one sedimentary, the other aeolian.

With only two workmen using shovels, it was not possible to clear the 5 000 m² area over which the blocks are spread on the surface. Therefore, we changed strategy and, using a hand auger, three cores were taken, spaced at 15 m intervals along a southwest – northeast axis, in order to determine the depth of the sandy deposit (see fig. 2). The first core went down 3 m, at which depth the auger probably hit a stone; the core was all sand. The second and third cores went down to 3.26 m, which is the maximum depth of the auger, and also produced only sand.

Given these results, one can conclude that this part of the site, between Jabal Ithlib and the town, was subject to major accumulation of sandy sediments. There is nothing to indicate by how much this accumulation post-dated the ancient town.

The monument to which these surface blocks belonged has not been identified and there is nothing to indicate that it may lie below.

Ith 68

The second structure that we looked at in 2009 had also been found during the initial surveys of the site, and it was mentioned in the internal reports. It is a circular structure, located to the southwest of Jabal Ithlib and about fifty metres west of hillock Ith 69-77 (fig. 4). It is not visible on the satellite image and lies outside the range of aerial photographs of the IGN.⁴

On the surface, it looks like a crown, about 11 m in diameter, made of sandstone rubble pieces from 10 to 20 cm long, sometime larger, resting on the sand (fig. 5). The rubble is not aligned

³ The largest fragment measures 24 x 25 cm and probably belongs to square brick.

⁴ UTM Coordinates x 397 336 / y 296 2847, altitude 811 m.

and the crown has no clear edges. Numerous green-coloured fired brick fragments were also noted on the surface before the excavation. Finally, still on the surface, but *outside* the structure, six large blocks of white sandstone were found (fig. 6). They are heavily eroded and show no traces of dressing,⁵ but the arc shape of their long sides does not appear to be natural. One of these is 55 cm long, between 18 and 35 cm deep and 30 cm high. Everything seems to indicate that they are heavily eroded Nabataean pilaster capitals, the origins of which remain unknown (fig. 7). Fragments of other architectural blocks were found during the excavation, perhaps belonging to a monumental structure, which no longer exists, that was older than the structure of Ith 68 itself (see below).

In order to determine the nature of this structure, an east-west trench, 2 x 10 m, was laid out from its supposed centre to its western edge, crossing one half of its internal part, the outer crown and a few metres outside (see figs 6 and 34). The trench was excavated from east to west, that is to say from the inside to the outside. At 3.65 m from the supposed centre of the structure, a grey surface appeared that was harder than the rest of the surface of the trench, which consisted mainly of aeolian sand containing very little material.

Whilst the trench was being excavated, the southern part of the surface of the structure was carefully scraped clean with trowels and swept, in order to expose the whole of the rough square formed by this grey layer. The difference between the fill inside the structure and the square formed by the grey layer is clear, even if its exact limits are not. The interior is soft and sandy, whereas the pseudo-square is grey, fine and resistant to the trowel. The top layer of small rubble, which characterized the surface of the structure before excavation, was also removed. These were mostly simple stones placed on the sand, some barely sunk into it. What appeared as a result of the surface scraping is a structure that is probably square, characterized by a grey layer in which there are pieces of sandstone rubble.

A few architectural fragments were found in the sandy surface layer:

- 60300_S01: small fragment of white sandstone with a trace of fairly careful moulding (figs 8-9);
- 60300_S02: small fragment of white sandstone with traces of dressing with a pick and gradine (fig. 10);
- 60300_S03: small fragment of white sandstone, approximately square, which has a triangular-shaped notch in its centre (figs 11-12);
- 60300_S04: red sandstone block with the remains of five lines of a South Arabian inscription (figs 13 and 14). It reads as follows: ----² ----tn | ..----³ ----t | 'rb⁴ ----hl | t----⁵ ----. It is not possible to suggest a translation.
- 60300_S05: fine polished sandstone object, broken on two sides and whose upper part ends in a sharp ridge (fig. 15).
- 60300_S06: fragment of white sandstone cornice (?) (figs 16-17).

⁵ Only one, illustrated in figure 7, shows traces of pick marks in the shape of small holes.

Excavation of the trench

Excavation in the trench began in the inside of the structure. Two layers of sand (60300 on the surface and 60301 below, which is characterized by a more aerated and honeycombed sand at the surface) covered a very hard grey layer, 60304, which is in direct contact with the grey layer that represents the square structure, 60303 at the surface (fig. 18, east part of north section and fig. 19, east part of south section). The stratigraphy of these two layers is not easy to determine, but it seems probable that 60304 was a fill that predates 60303 (fig. 20). This latter layer shows up in the section as a small mound between 1.20 and 1.50 m wide and 40 cm high, in which there are a few pieces of fired brick of different sizes (see below), some mortar fragments that bonded them together and a few small stones, 10 to 15 cm long (figs 21-22). In places, ash lenses indicate at least partial destruction by fire. Taken altogether, 60303 seems to be a destruction layer with no *in situ* elements. It rests on a layer of homogenous sand, 60305, which presupposes that we are looking at a destruction that fell onto sand that had had time to accumulate on the bedrock. As for layer 60304, it rests directly on bedrock, except in certain places, visible mostly in the east section (figs 23-24). It contains numerous small-sized sandstone blocks, two large blocks which are perhaps construction blocks, one or two fragments of brick and one fragment of moulded block, 60304_S01 (figs 25-26), broken on all sides.

Continuing the excavation to the outside of the structure, on the other side of the mound formed by 60303, showed that the hard layer 60304 was not present on the outer side. We found only sand there, 60302 at the top, and below it a layer of homogenous sand, largely natural and containing no archaeological material, 60305. Bedrock was reached at 80 cm below the surface in a sounding put in at the western end of the trench. Layer 60302 produced a fragment of a stone basin (figs 27-28), 14.5 cm high while the thickness of the sides varies between 2.7 and 4 cm. The upper part of its profile is much narrower than the lower part.

The bricks

All the brick fragments picked up on the surface and found during the excavation of the trench were put aside so as to estimate the quantity of brick contained in the structure (fig. 29). There are three sizes of bricks on the site:

- square bricks, of 36 to 36.5 cm per side (fig. 30);
- rectangular bricks, measuring exactly half of the square brick and which probably result from the splitting of square bricks. Thus they measure between 17 and 18 cm wide by 5.5 to 6 cm thick. (fig. 31).
- round bricks, measuring 30 cm in diameter and 6 to 6.5 cm thick (fig. 32).

The two main faces of the bricks do not look exactly the same. One is a grey-green colour and smooth and soft to touch, while the other is granular, less homogenous and the colour varies from grey-green to red. Seen in section, the majority of the bricks are mostly green, though some are very red (fig. 33). The bricks are hard and they do not contain any temper visible to the naked eye.

Conclusion

Nothing remains *in situ* of the excavated monument (fig. 34). It was visible on the surface in the shape of a large circle of stones, which seemed to have been more or less placed on the ground, associated with fragments of fired brick (fig. 35). At an altitude of 811 m, it dominates a large part of the site, particularly the residential area. Its position also overlooked the caravan route that is thought to have passed to the east of hillock Ith 69-77 and between the eastern and western parts of Jabal Ithlib. It is possible that Ith 68 was linked to the presence of the high place Ith 69-77 and that it was some sort of sanctuary annex. However, the distance between them, some fifty metres, does not favour this idea. A second hypothesis, which we prefer, is to see Ith 68 as the remains of a watch tower. Unfortunately, the monument has been completely destroyed and nothing remains of it above ground. However, it can be assumed that a large amount of very hard construction fill was first put down on the bedrock or sand (see fig. 24, the east section, where layer 60304 rests on sand). This fill had to carry a structure of fired brick, which collapsed towards the outside onto a pre-existing layer of sand. The structure must have been quite small and in any case contained within the space defined by the circle of stones. It was probably square, measuring between 6 and 7 m per side. Amongst the sherds found in layers 60303 and 60304, only one could be dated by the ceramicists, to the 1st century AD.

QB 6

Structure QB 6 was found by survey and is situated to the southwest of the Qasr al-Bint.⁶ Before excavation, it consisted of two heaps of fallen blocks, the larger and higher one to the east, the smaller one about 5 m to its west (fig. 36). They are mainly well dressed construction blocks that must have come from a building of some importance. The hypothesis was that this might be a tomb.

Excavation of this double structure began on the larger of the two heaps. The top layer of blocks, which were either laid on or just within the very soft sand, were removed, thereby revealing a second layer of blocks laid on a level surface and an outcrop of white sandstone (fig. 37). Removal of this second layer of blocks (approximately forty blocks altogether, none of which were *in situ*⁷) revealed a layer of sand and a series of sandstone blocks, whose surface disintegrates like chalk, forming the outline of a quadrangular structure, the southern part of which has completely disappeared (figs 38-39). This structure rests directly on the sand, with no foundations (figs 40-41).

The general impression produced by the removed blocks is that they were not really laying as if they had fallen from collapsing walls of a built monument. Rather, they seem to have belonged to a solid, but destroyed, monument most of whose blocks had been taken for reuse

⁶ UMT Coordinates x 396 504 / y 296 3205.

⁷ Dimensions of a few blocks: 40 x 52 cm and 12 cm thick (slab); 28 x 60 cm and 20 cm thick; 29 x 52 cm and 28 cm thick; 30 x 53 cm and 23 cm average thickness, with the beginnings of moulding visible; 33 x 68 cm and 10 cm thick (slab); 30 x 50 cm and 7 cm thick (thin slab); 26 x 50 à 57 cm and 16 cm thick; 20 x 57 cm and 13 cm thick.

and some of which were stored nearby, thus producing the second heap of blocks. This latter, in fact, did not cover any *in situ* structural remains; it simply produced about thirty blocks of differing sizes, including some complete slabs (0.38 to 0.46 x 1.10 m and 8 to 10 cm thick, 35 x 76 cm and 14 cm thick), some blocks (34 x 50 cm and 28 cm thick, 29 x 70 cm and 15 cm thick, 26 x 66 cm and 16 cm thick, 33 x 60 cm and 23 cm thick). Two slabs are of particular interest, for one of their small sides is decorated with a series of rectangular bands containing lines of dots that alternate in one direction and the other (figs 42-43). Blocks with a similar type of decoration were found in areas 1 and 7 of the residential area. They might have belonged to more ancient monuments and been reused in Nabataean monuments of the 1st century.

The interpretation of this structure is difficult. The ceramic material is limited and not very diagnostic since it consists mostly of coarse wares that have not yet been dated. One sherd only was dated by the ceramicists to the second half of the 1st century AD. It is probably reasonable to discard the hypothesis of a tomb since nothing in the layout nor the finds lends itself to this interpretation. Is it, instead, a monument associated with either the necropolis of the Qasr al-Bint or the residential area?

Altogether, the work carried out in 2009 on these isolated structures, away from the residential, funerary and religious parts of the site, have been disappointing. The structures brought to light are completely eroded away and apart from the remains of QB 6, there were no *in situ* elements and the finds were very limited.

Appendix 1: description of the blocks on the surface of Ith 105

no. 1

Column drum of white sandstone, fairly eroded above and below.

Probably complete diameter: 53 cm.

Preserved height, probably almost complete: 22 cm.

No mortise.

no. 2

Half-column drum of white sandstone.

Preserved diameter: 66 cm.

Preserved height, probably almost complete: 26 cm.

no. 3

Construction block fragment. The upper and lower faces are preserved and traces of cutting are visible on one side.

Preserved dimensions: 30 x 30 cm and 37 cm high.

no. 4

Column drum of white sandstone, eroded on all sides.

Preserved diameter: 47 cm.

Preserved height: 24 cm.

No visible mortises.

no. 5

Column drum of white sandstone.

Probably complete diameter: 51 cm.

Preserved height: 16 cm.

No mortise.

no. 6

Column drum of pink sandstone, eroded.

Preserved diameter: 51 cm, but there are no cutting marks on the sides and the drum may have been a little larger.

Preserved height: 35 cm.

Mortise above and below, eroded.

no. 7

Column drum of white sandstone, heavily eroded.

No complete dimensions preserved.

Preserved diameter: 51 cm.

Preserved height: 24 cm.

no. 8

Column drum of white sandstone.

Mortises above. It is broken in its thickness and there is therefore no mortise visible below.

Preserved diameter: 56 cm.

Preserved height: 14-15 cm.

no. 9

Fragment of column drum in the form of a quarter circle. No dimension available.

no. 10

Column drum of white sandstone, very eroded.

No moulding is visible on the sides and there are no traces of cutting.

Preserved diameter: 53 cm.

Preserved height: 20 cm

no. 11

Column drum of white sandstone.

Preserved diameter 51 cm, but it is not perfectly circular and only one side seems original.

Preserved height: 25 cm.

No visible mortises.

no. 12 (fig. 44)

Column base of white sandstone (?), eroded.

Preserved diameter: 56 cm.

Thickness: from 17 to 22 cm.

No trace of mortise above and a square mortise 6 cm per side below.

no. 13 (fig. 45)

Probably a column base (?) of white sandstone, with very eroded mouldings, the original diameter is not visible.

Preserved diameter: 65 cm (it has lost at least 10 cm).

Preserved height: 21 cm.

Mortises above and below, 8 cm wide and 2 cm deep, surrounded by a rabbet of 0.5 cm.

no. 14

Column drum fragment, very eroded. No diameter possible, thickness 12 cm.

no. 15 (fig. 46)

Base (?) of pink sandstone column, eroded.

Diameter complete, or nearly so: 75 cm.

Preserved height: 24 cm.

In the middle an eroded mortise of indeterminate shape, 8 cm wide and 3 cm deep; also a mortise below.

no. 16

Base (?) of white sandstone column, eroded.

Preserved diameter: 58 cm.

Preserved height: 24 cm.

Mortise above; no mortise visible below because it is eroded.

No moulding visible on the sides.

If this base is of the same diameter as no. 15, it means that it has lost 20 cm.

no. 17 (fig. 47)

Nice base of white sandstone, eroded, with the recess of the main moulding still visible

Above, a square mortise of 4.5 cm per side and 4 to 5 cm deep; traces of mortise below.

Preserved diameter: 74 cm.

Preserved height: 30 cm.

no. 18

Column drum of hard sandstone, with violet veins.

Diameter: 53 cm.

Preserved height: 24 cm.

No mortise above or below.

The lower face shows no traces of cutting but letters or a drawing have been pecked on it. These are neither Arab nor Nabataean letters.

no. 19 (fig. 48)

Column base of pink sandstone.

Preserved height: 24 cm.

The diameter is complete in two places where the block is not eroded: 75 cm.

Square mortise above, of about 4 x 6 cm and 3 to 4 cm deep; mortise below.

no. 20

Half-column drum of white sandstone, very eroded.

Preserved diameter: 47 cm.

no. 21

Column drum fragment of white sandstone.

Preserved diameter: 55 cm.

Preserved height: only 12 cm.

no. 22 (fig. 49)

White sandstone column drum, eroded but with more or less complete diameter and height.

Diameter: 53 cm.

Height: 33 cm.

Mortise above, eroded; no visible mortise below because the drum is broken in its thickness across the majority of the surface.

no. 23 (fig. 50)

Nice column drum of hard sandstone, with violet veins.

The diameter is complete and perhaps also the height. Traces of cutting in dots are distinguishable on the top (they have disappeared from below).

Diameter: 53 cm.

Height: 24 cm.

Square mortise above, eroded, 4 cm per side; no mortise below.

Blocks no. 1 to 23 do not all come from the same quarry since some are of pink and others of white sandstone. The two white sandstone blocks with violet veins have suffered the least erosion because this sandstone is very hard. It should be noted that bases no. 15 and 17 are more or less of the same diameter, but not quite the same thickness. Is one of them more eroded than the other, or should one assume that they do not come from the same building? In this group, there are altogether fifteen column drums or fragments of drums, six column bases and one construction block. The diameter of the drums varies from 55 to 66 cm, but several of them have a diameter of 53 cm (no. 1, 10, 18, 22 and 23) and others of 51 cm (5, 6, 7, 11), which

might belong to the same size group. A single column drum, no. 2, is much larger (66 cm in diameter). As for the bases, there are two main diameters, around 56 to 58 cm (no. 12 and 16), and around 75 cm (no. 15 and 17).

Bibliography:

J.-M. Dentzer, A. Kermorvant, L. Nehmé, L. Tholbecq, H. Abu al-Hassan, "Report on the 2002, Second Season of the Saudi-French Archaeological Project at Meda'in Saleh", *Atlat* 18, 2005, p. 61-80 [English], p. 153-159 [Arabic], pls 9.1 to 9.23.



Fig. 1. Location of trenches excavated by L. Nehmé in 2009

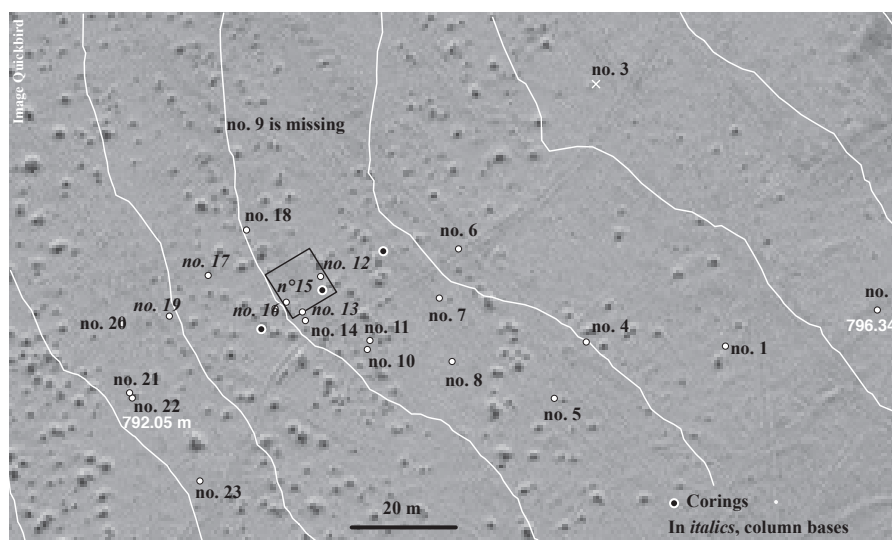


Fig. 2. Ith 105, blocks found on the surface of the sandy area

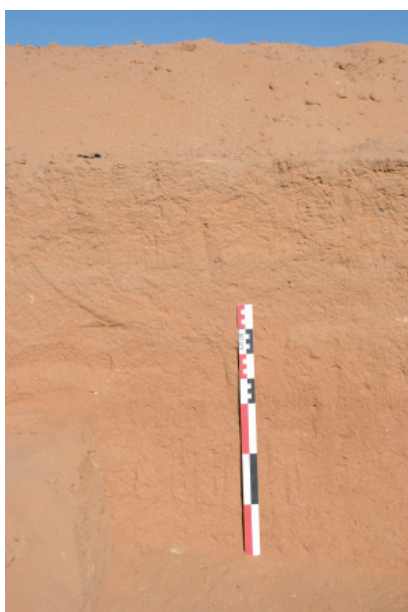


Fig. 3. Ith 105, homogenous sand in the sounding in the area of Ith 105

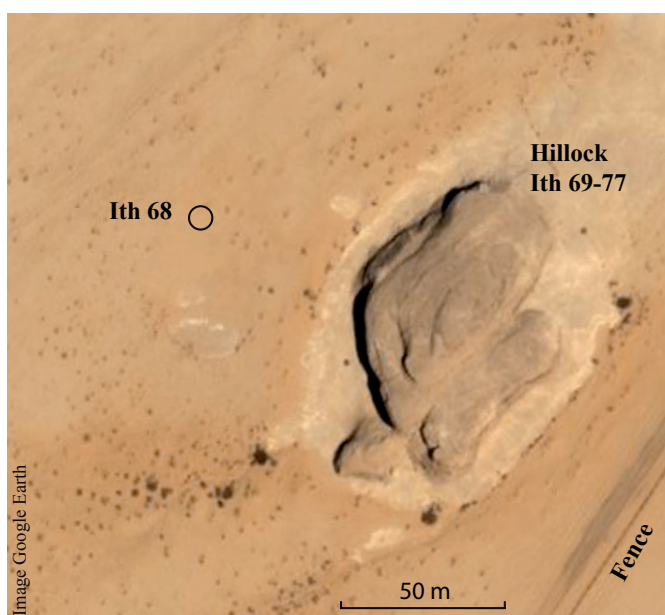


Fig. 4. Location of Ith 68 relative to Ith 69-77



Fig. 5. Ith 68, general view before excavation, from top of Ith 69-77

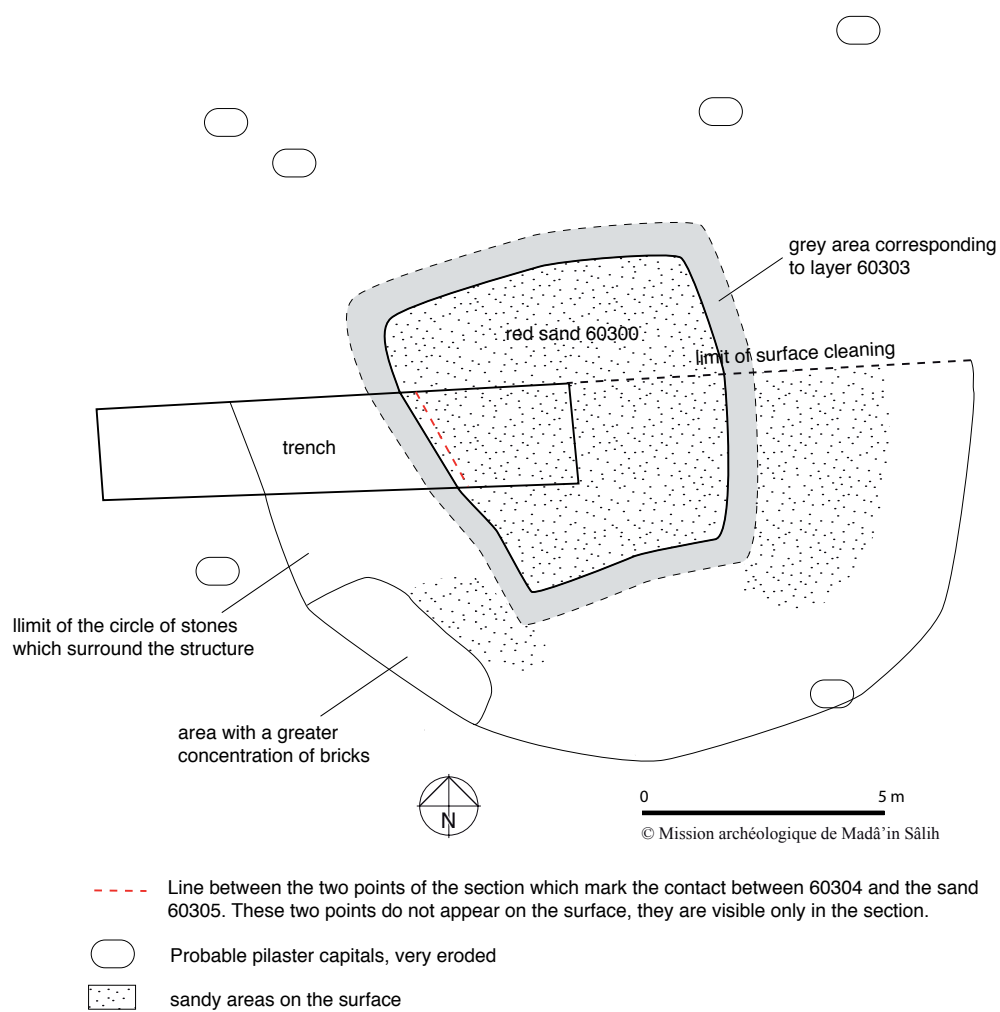


Fig. 6. Diagram of Ith 68



Fig. 7. Ith 68, capital of a pilaster (?)



Fig. 8. Fragment of moulded sandstone 60300_S01

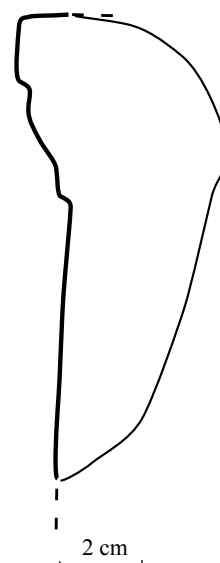


Fig. 9. Profile of 60300_S01



Fig. 10. Fragment of white sandstone with traces of dressing with picks and gradine 60300_S02



Fig. 11. Fragment of white sandstone with a triangular shaped notch 60300_S03

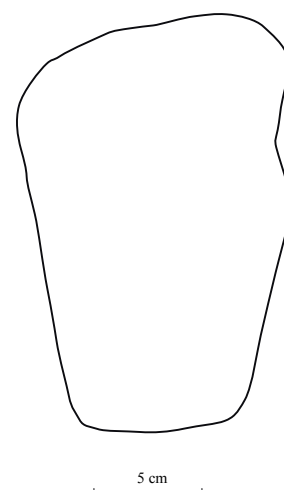


Fig. 12. Profile of 60300_S03



Fig. 13. Fragmentary South Arabian inscription, 60300_S04



Fig. 14. Facsimile of the South Arabian inscription

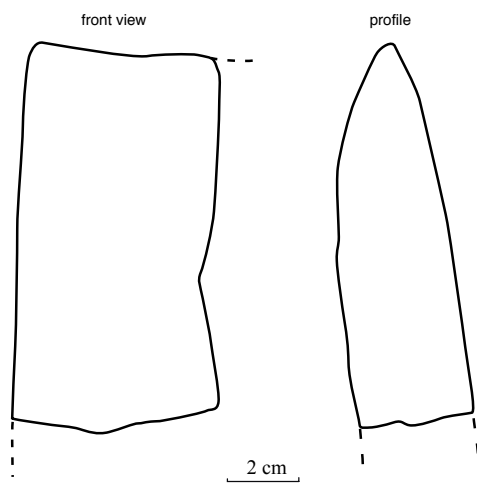


Fig. 15. Drawing of 60300_S05

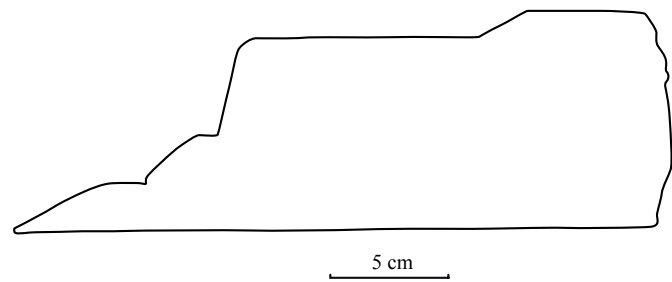


Fig. 16. Fragment of white sandstone cornice (?) 60300_S06



Fig. 17. Profile of 60300_S06

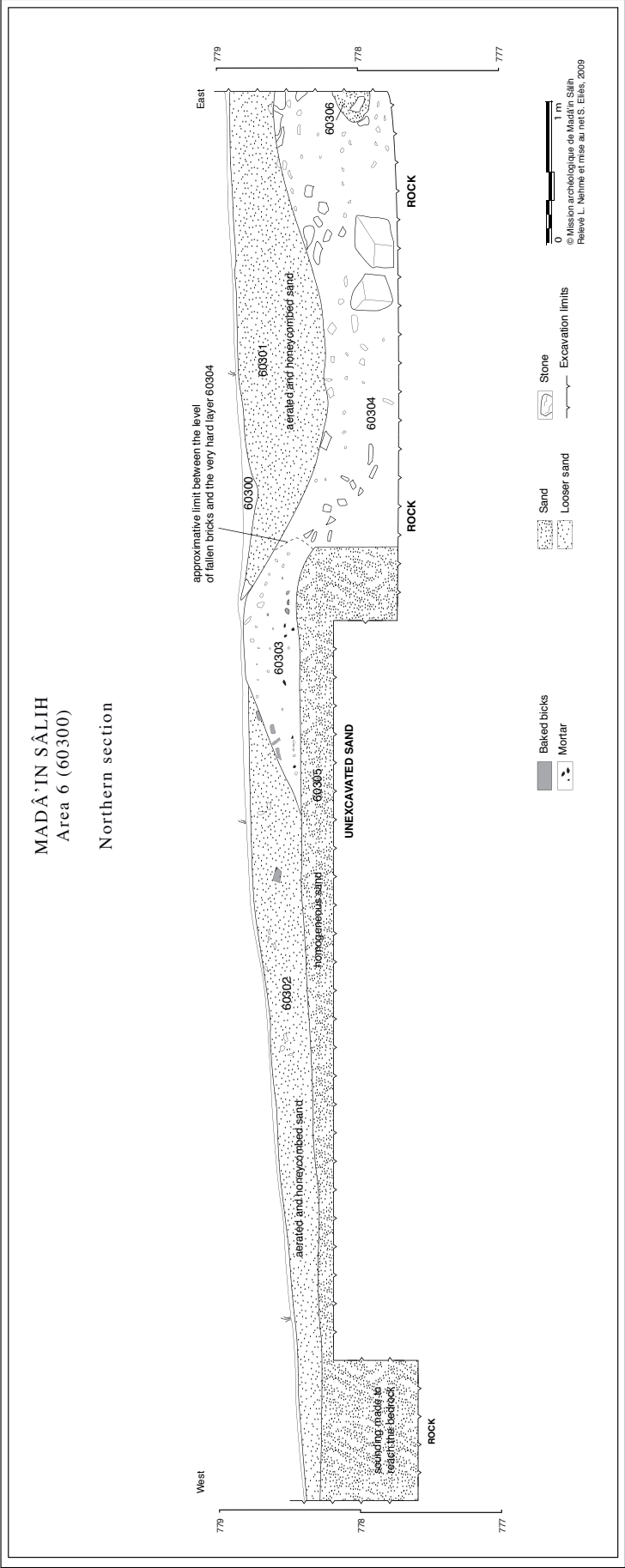


Fig. 18. Ith 68, north section

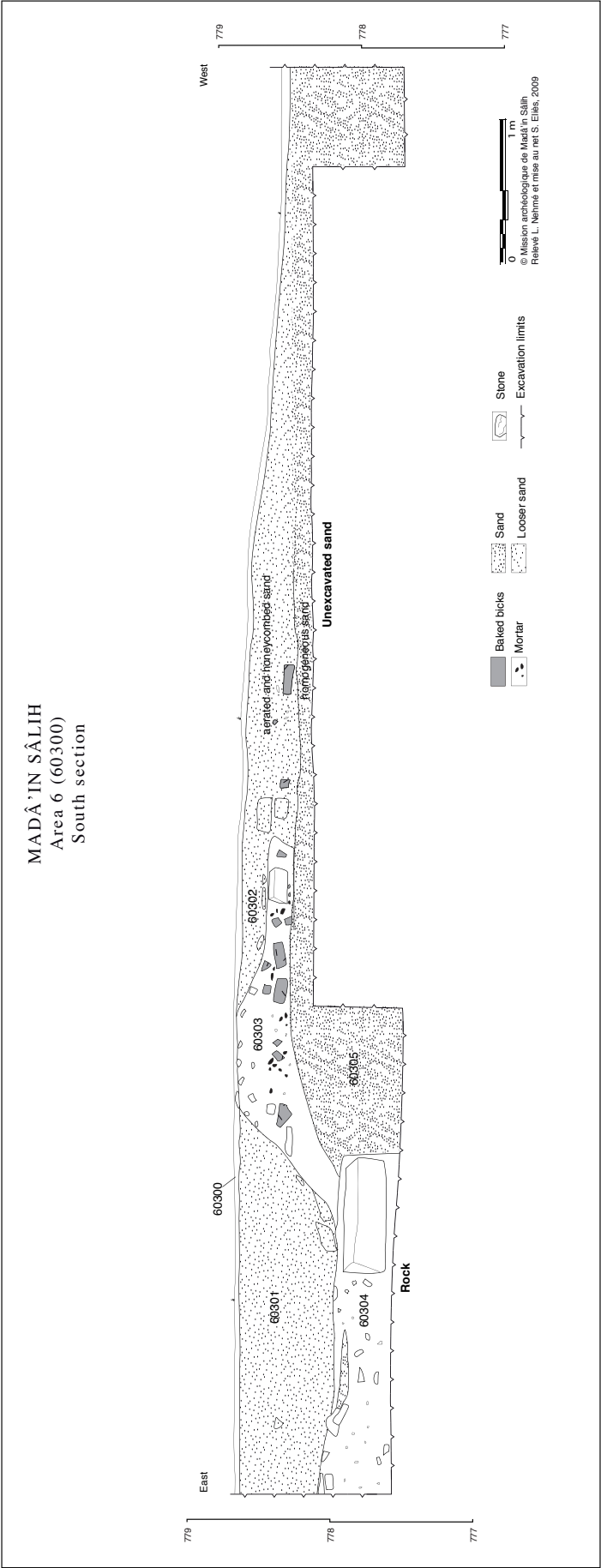


Fig. 19. Ith 68, south section

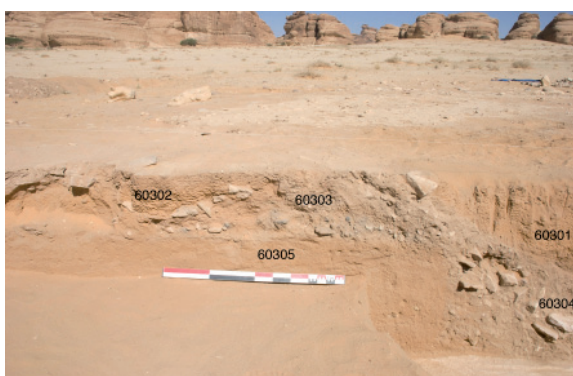


Fig. 20. Ith 68, view of north section, at the contact between 60303 and 60304

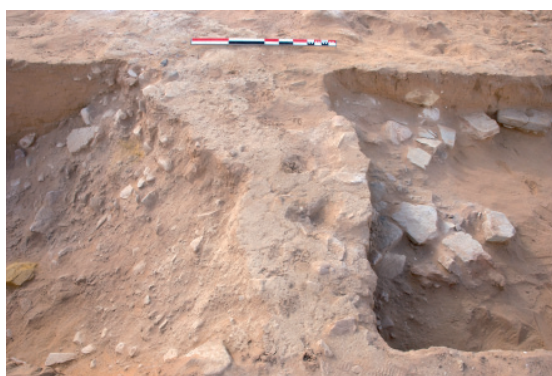


Fig. 21. Ith 68, small mound 60303 seen from above



Fig. 22. Ith 68, central part of south section

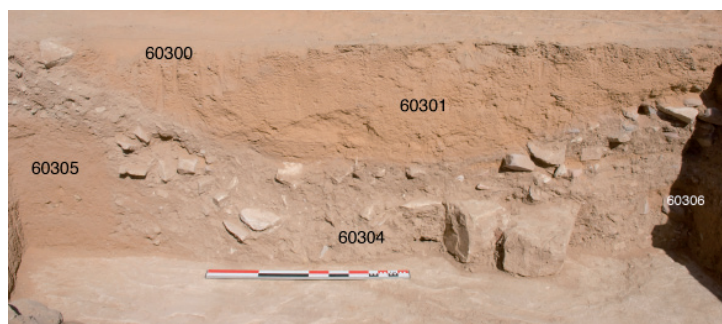


Fig. 23. Ith 68, east part of north section



Fig. 24. Ith 68, east section



Fig. 25. Fragment of moulded white sandstone 60304_S01

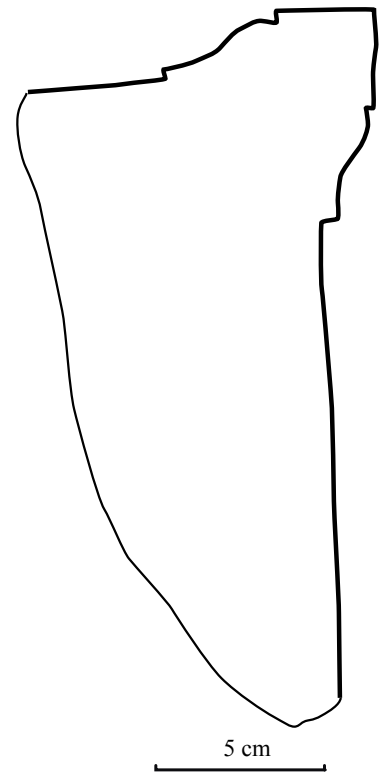


Fig. 26. Profile of 60304_S01



Fig. 27. Fragment of stone basin 60302_S01

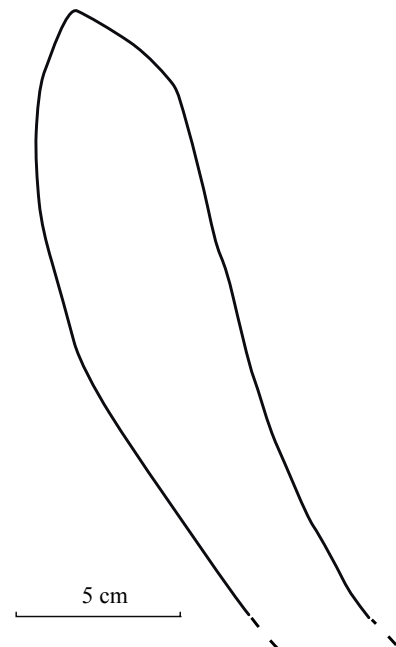


Fig. 28. Profile of 60302_S01



Fig. 29. All the mudbrick fragments found in the trench in Ith 68



Fig. 30. Square mudbrick

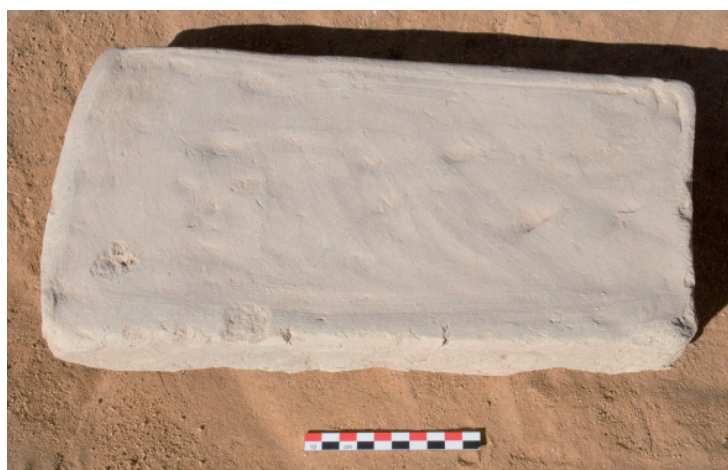


Fig. 31. Rectangular mudbrick



Fig. 32. Round mudbrick

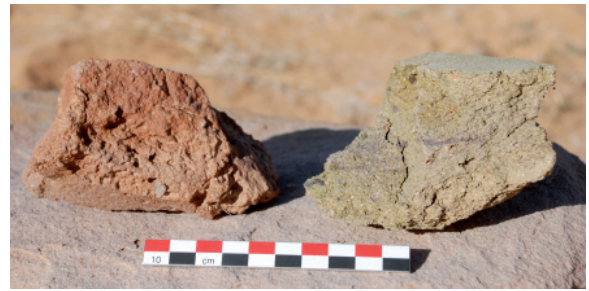


Fig. 33. Fragments of green and red mudbrick



Fig. 34. Ith 68 after excavation

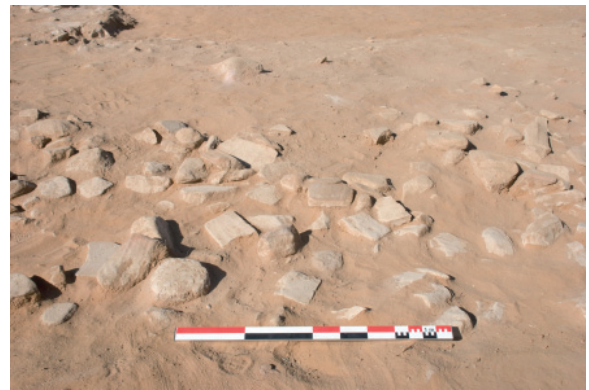


Fig. 35. Stones of the circle of Ith 68



Fig. 36. The two heaps QB 6 before excavation, seen from the east



Fig. 37. QB 6 east after removal of the first layer of blocks

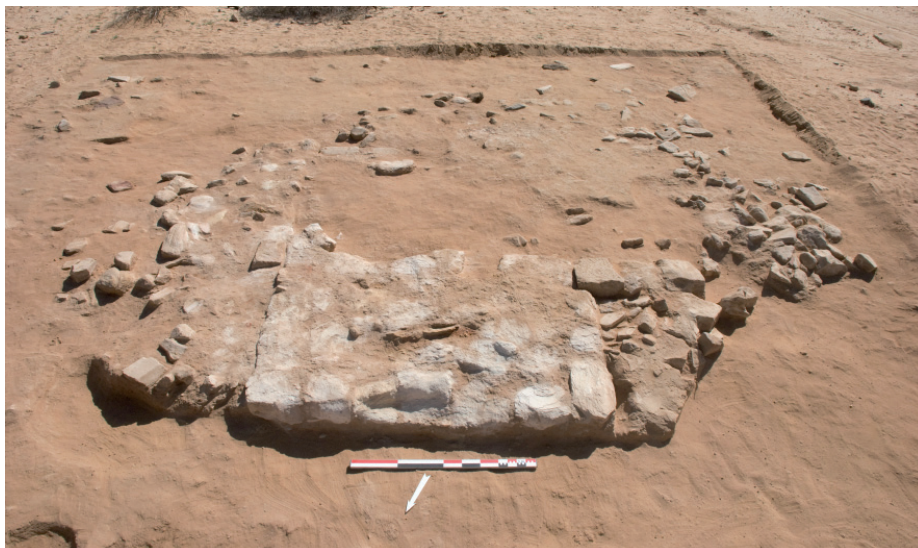


Fig. 38. QB 6 east after removal of all the blocks, seen from the north

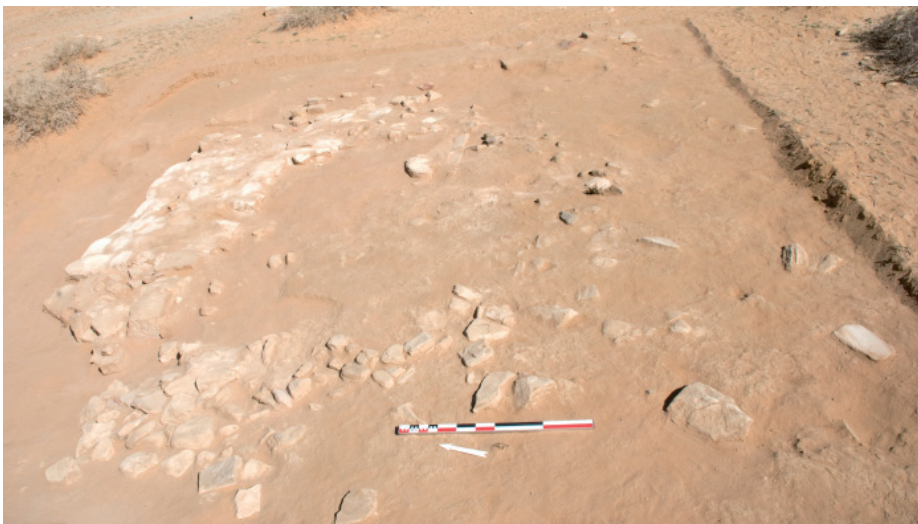
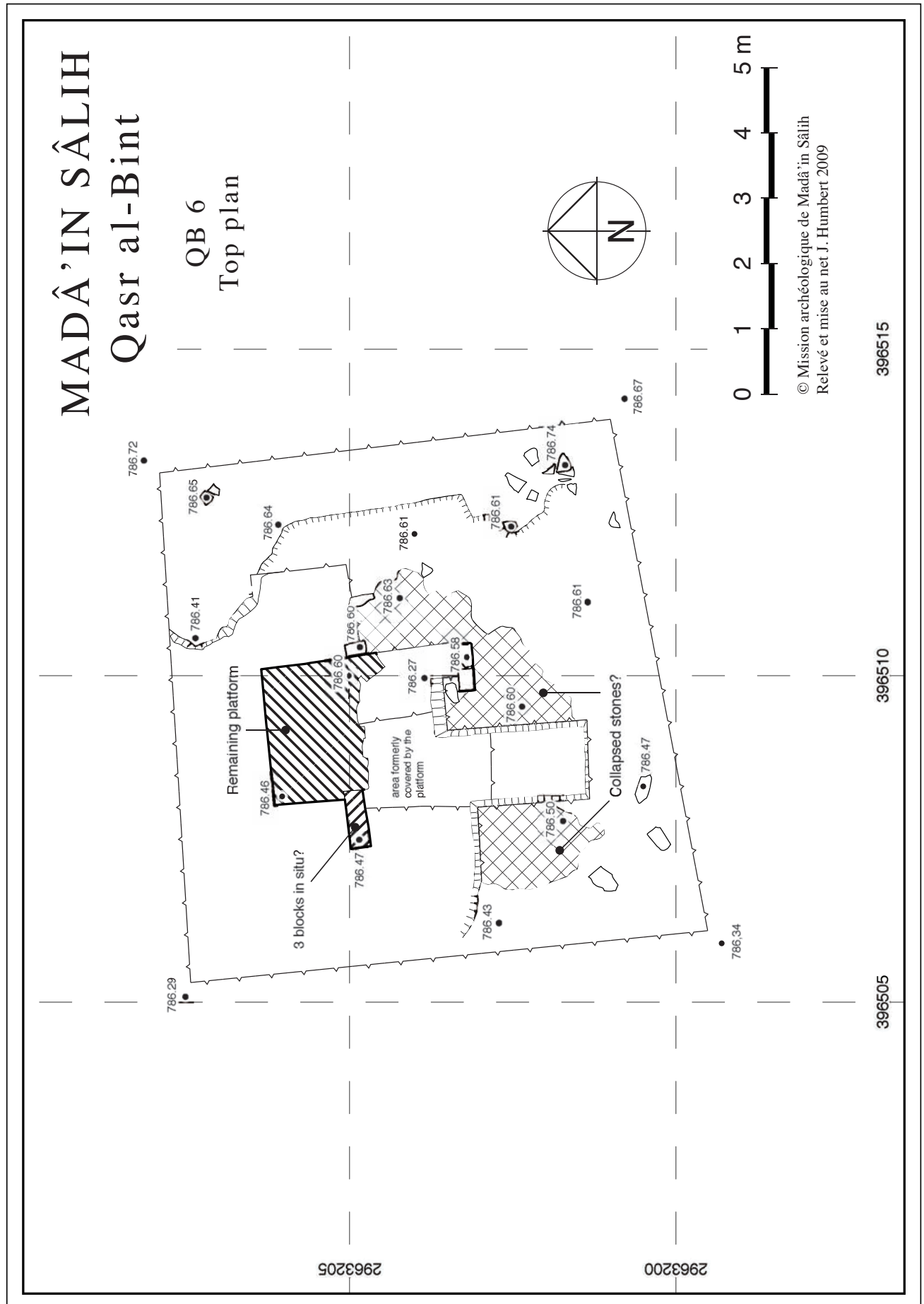


Fig. 39. QB 6 east after removal of all the blocks, seen from the west



Fig. 40. QB 6 east after excavation



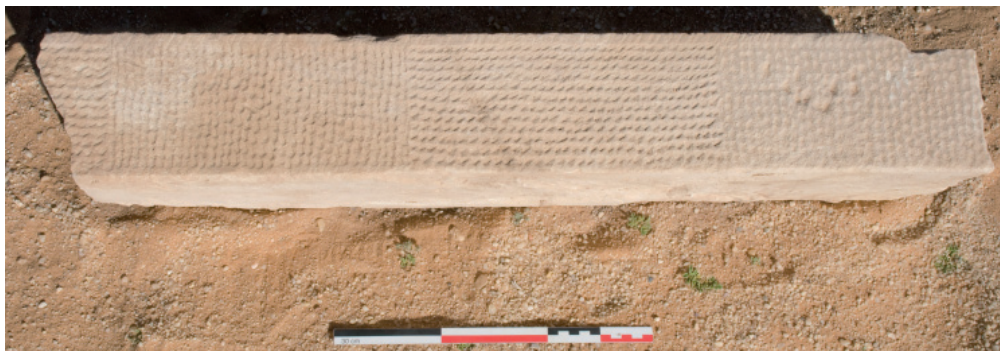


Fig. 42. QB 6 west, slab with decorated face



Fig. 43. Detail of the decorated face of the slab



Fig. 44. Ith 105, column drum no. 12



Fig. 45. Ith 105, column base no. 13

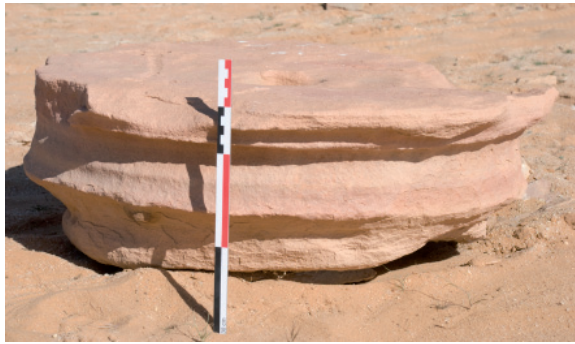


Fig. 46. Ith 105, column base no. 15

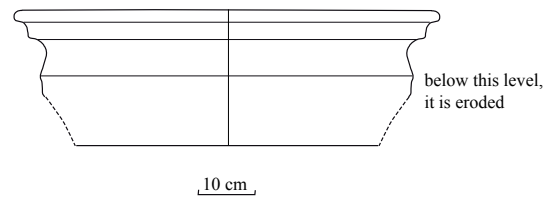


Fig. 47. Profile of column base no. 15



Fig. 48. Ith 105, column base no. 17



Fig. 49. Ith 105, column base no. 19

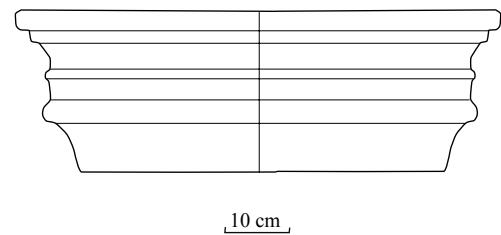


Fig. 50. Profile of no. 19



Fig. 51. Ith 105, column drum no.22



Fig. 52. Ith 105, column drum no.23

Restoration in Area 7, Residential Area

Restoration in Area 7, Residential Area

Dhaifallah al-Talhi and Mutlaq al-Mutlaq

Part of the work undertaken during the 2009 season was devoted to completing the restoration work which had started in 2008. The aims were to complete the restoration of the excavations conducted by the Department of Antiquities in 1986 and to start restoring the ongoing excavation, which meant that new methods had to be tested. Mortar and mudbricks were prepared and tested. Several masons with considerable experience in working with mud buildings were hired and some samples were prepared and tested.

It is worth noting that this process had already started in 2008. M. Gelin had indeed tested a few loam samples from four different locations around the site.¹ The first location was the large wadi to the southwest of the site, the second one was to the west of the site (from a quarry which is still in use), the third one was in the northwest of the site while the last one was to the west of the site, just near the entrance². Several tests were carried out to examine the mechanical resistance of the soil, and to evaluate the grain size of the mineral elements and organic materials. Finally, soils no. 1 and 3 seemed best suited.

With regard to the restoration, several recommendations were made in last year's report:

- to work only on the newest phase and bury the oldest phase to prevent confusion;
- to fill the soundings up to the base of the walls to protect the foundations;
- to level the filling in order to direct the rain water to the centre of the room, as far as possible from the foundations;
- to lower the level of the baulks in order to avoid confusion between baulks and walls;
- to refill the joints between the courses;
- to protect the mud walls by adding a new course on top of the remaining one.

¹ M. Gelin, "Treatment, Conservation and Restoration of Mudbrick Structures", in L. Nehmé, D. al-Talhi and F. Villeneuve (eds), *Hegra I. Report on the First Excavation Season at Madâ'in Sâlih, Saudi Arabia*, 2008. Riyadh, 2009, p. 27-46.

² Ibidem, see aerial photo p. 37, fig. 1.

Restoration

Room no. 5 from the former excavations of Area 7 (see D. al-Talhi and A. Alanzi's report, fig. 2) was chosen for a conservation test. The debris were removed and the trench was refilled with a slope towards the centre of the room. Holes in the walls were filled with small stones and mortar.

For the stone walls, various ideas were suggested, such as:

- cover the upper part of the wall with a thick layer of mortar (10 cm) in order to protect the stones;
- place one course of stones on top of the existing one;
- place one course of mudbricks on top of the existing stone course.

The tests which were conducted last year were very useful because they gave us the chance to evaluate their results one year later. In 2008, the mortar which was used consisted of mud and straw mixed with water; no additional materials were added. The site experienced a reasonable amount of rain since the end of the 2008 season and when we arrived in January 2009, we found that some pieces of the mortar had been washed away. Cracks were noted on the mortar and pieces had fallen down (fig. 1). It was therefore necessary to adopt a new way of preparing the mortar.

At Taymâ', where such restorations are also being carried out, many experiments were conducted by the Saudi-German team and some solutions were applied. Professor R. Eichmann and J. Breitenfeldt (from the restoration team at Taymâ') presented the methods they used. The recipe was tested and used in Madâ'in Sâlih.

First, the loam was collected from quarry no. 1, which was located in 2008 by M. Gelin. Loam was crushed and sieved with a 4 mm sieve (fig. 2). Sand and stone granules were added, followed by palm fibers previously cut into small pieces of about 0.5-1 cm long (fig. 3) Water was added at the end and the paste was mixed.

The mixing ratio was:

Sand and stone grits:2

Loam:1

Hydrated Lime (Calcium hydroxide): $\frac{1}{2}$

Palm fibers: $\frac{1}{4}$

A specimen was prepared outside the excavation area and left to check its hardness. Some walls were cleaned and the mortar was applied. The next day, various cracks appeared in the mortar. It was therefore decided to add more sand to the mixture and to make new tests. It was checked the following day and the result was satisfactory.

The restoration work started by removing some of the baulks in order to give a clearer view of the building's structure. Deep trenches were filled up with sand in order to protect the foundations and to prevent water from affecting the fragile sandstone boulders. The fill was given a slope towards the centre of the trench to direct water far from the foundations.

The northwestern room of the unit (Room 1) was chosen for restoration (fig. 4).

The baulks which intersect in the middle of the room were removed. It was obvious that the northern wall was damaged and that some stones were missing.

Some recommendations from last year report were applied such as:

- refill some of the trenches to cover the foundations;
- refill the spaces between the stones of the walls with mortar and make a slope from the foundations to the middle of the trench in order to protect the walls from water. After removing the baulks and restoring the walls by replacing missing the stones and filling the gaps with mortar, the room looked in a much better shape (fig. 5).

Manufacturing of new mudbricks

During the 2009 season, more mudbrick walls were discovered. Some of them were eroded and in bad condition. It was therefore decided to protect the upper course with a new course of mud bricks.

At al-Mâbiyât, a nearby Islamic site, which is being excavated by King Saud University, new mudbricks were manufactured during some recent excavation seasons. These were added to the old walls in order to protect them. Dr Abdulnasser al-Zahrani, in charge of the restoration project in Mâbiyât, offered his experience to manufacture the bricks in Madâ'in Sâlih.

The mixture ratio consisted of (fig. 6):

Loam:2

Sand with crushed fired mud bricks:1

Straw pieces:½

A plastic sheet was placed under the mix to prevent salt penetrating from the ground into the paste.

First, loam was mixed with straw and sand. Note that it is advisable to wash the sand in order to remove the salt from it. The straw should be cut into 1-2 cm long pieces. Sweet water was then added and all the components were thoroughly mixed. The paste was left for a week, after which it was mixed by foot until it became homogeneous (fig. 7). The mud mixture was then poured into a mould (fig. 8) and the new bricks were left to dry for a few days (fig. 9).

Note that a small amount – one single handful – of hydrated lime was added to the paste to prevent cracks.

A local builder from al-‘Ulâ, ‘Awdah Breckait (fig. 10), who has been working with mudbricks for over 20 years, was asked to come to the site to make us benefit from his experience. He examined the mortar and the paste in the mould and was satisfied with both the paste and the procedure. Note that some ash was added to make the color darker because the hydrated lime (*nûra*) made the paste look too white.

A number of mudbricks were produced and added to the upper existing courses in selected areas to protect them. This procedure was adopted satisfactorily and will be evaluated next season.

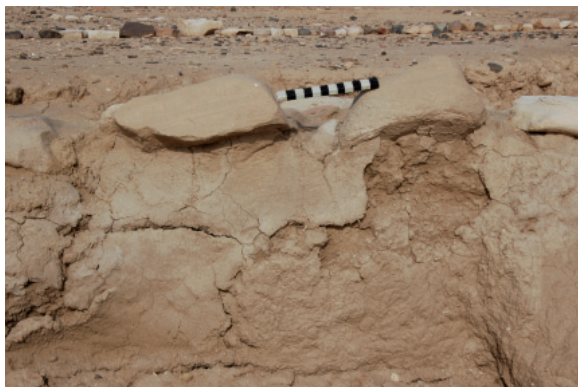


Fig. 1. Cracks on the mortar and fallen pieces



Fig. 3. Palm fibers cut into small pieces



Fig. 2. Loam crushed and being sieved with a 4 mm sieve



Fig. 4. Room 1 before restoration

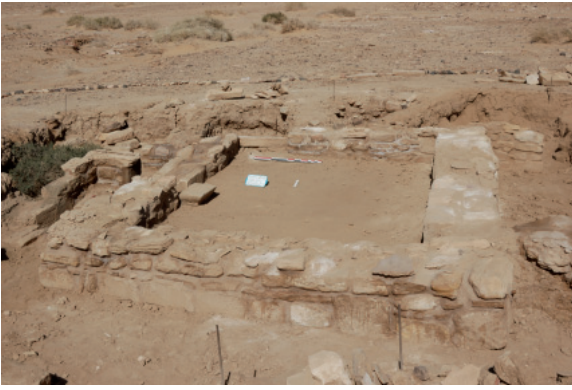


Fig. 5. Room 1 after restoration

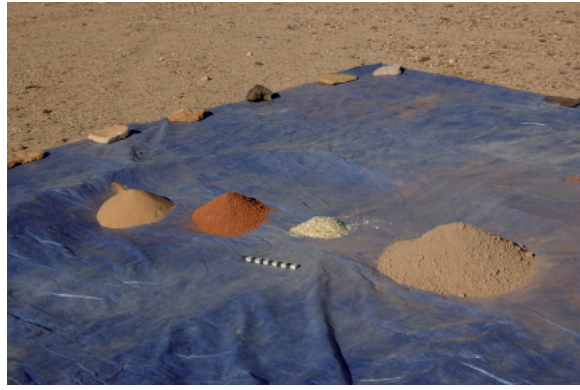


Fig. 6. The components used to make the new mudbricks before being mixed together



Fig. 7. Mortar mixing with the feet



Fig. 8. Mud poured into the mould



Fig. 9. Mudbricks left to dry



Fig. 10. Mr Awdah Breckait giving advice about the mortar

The Archaeobotanical Remains

The Archaeobotanical Remains

Charlène Bouchaud

This report summarizes the work carried out over the past year on the archaeobotanical data recovered from the site of Madâ'in Sâlih. The preliminary study¹ looked at the desiccated botanical remains found in the Nabataean tombs, comprising some pieces of manufactured wooden objects and the remains of food and decoration (seeds and fruits). This, second, study is devoted to the carbonized remains found mainly in the residential area associated with deposits from the Nabataean and Late Antique periods (4th to 6th centuries). Following a brief review of the methodology, the results will be presented along with the two main questions associated with them: which plants are attested in the different periods of occupation and what does this imply in terms of the diet of the population and of the palaeo-environment of the site.

I. Methodology and provenance

The methodology was adapted to the type of preservation of the botanical remains. In fact, the remains were preserved either through desiccation or carbonization. The whole collection was brought back to France for analysis (see list in appendix A). These botanical remains were studied using a binocular microscope, a reflected-light microscop and a transmitted-light microscop in the archaeobotanical laboratories of the Maison de l'Ethnologie et d'Archéologie (Department of Ethnology and Archaeology) at Nanterre and at the archaeobotanical and archaeozoological laboratory of the Museum National d'Histoire Naturelle (National Museum of Natural History) in Paris.

1.1. Finds from tomb IGN 117: 2009 season.

Excavation of tomb IGN 117 produced numerous wood fragments from the remains of coffers or various containers associated with the burials. These were carefully lifted by Isabelle Sachet and Nathalie Delhopital. Unfortunately, the majority of them are badly degraded. The wooden structures disintegrated over time and were replaced by sand (fig. 1) so that the initial shape of

¹ Bouchaud in Nehmé, al-Talhi, Villeneuve 2009, p. 299-312.

the artefacts was still visible, even though the woody substances which composed the objects had disappeared. Similar examples of the “transformation” of wood by sand can be seen in the old town of al-‘Ulâ, where many doors made of date palm or tamarisk are badly damaged (fig. 2). Some ligneous traces are still visible on their surfaces, but the thickness of the doors is composed of sand. In the tomb, some of the wood fragments still retained some ligneous parts, especially on the surface. It is probable that these wooden artefacts were exposed to the air for quite a long time. Thin section samples,² obtained using razor blades, were taken from the preserved pieces of wood for analysis, but the identification of species has not yet been done.

This tomb also produced some seed remains which could be identified immediately (fig. 3). The majority were collected by hand by the excavators.

Finally, sediment samples taken from fifteen *loci* were dry sieved (mesh size 0.5 and 0.375 mm). Seven samples produced no botanical remains, eight contained charcoal (50106, 50118, 50121, 50126, 50147, 50209, 50187) and one contained four carbonized grape pips (50121).

It is not impossible that the presence of these carbonized remains in the tomb, the charcoal and seeds, is due to aeolian deposition. Indeed, numerous modern chenopod seeds were found in these samples (50106, 50118, 50126). These plants are part of the desert vegetation found in large quantity on the site and their presence can be explained by wind action, so the wind could equally well have carried light pieces of charcoal and other seeds. The large quantity of micro-fauna (rodents and insects), suggest that the sediment could have been contaminated by intrusions subsequent to the inhumations (50121, 50147, 50209, 50187), which seems to be confirmed by the presence of animal scats in *locus* 50162.

These facts warn us to be very careful in the interpretation of the dried seeds and carbonized remains. We decided to concentrate, initially, on the more secure data provided by the carbonized carpological and anthracological remains from the residential area and Jabal Ithlib.

1.2. The carbonized remains from the residential area and Jabal Ithlib

During the two seasons (fig. 4), a total of one hundred and eighteen samples were taken: seventy were flotation samples (sixty-nine from the residential area and one from Jabal Ithlib) and forty-eight samples were collected directly, without flotation, by the excavators in the field.

The samples were sorted, using a binocular microscope, to separate the carpological (seeds and plant inflorescences) from anthracological (charcoal) remains. The carpological study is complete and includes fifty-seven samples. The charcoal analysis is underway and so far, sixteen samples have been examined out of a total of a hundred and eleven samples containing charcoal. The composition of the carpological remains having been identified (appendix B), it is possible to present an analysis of the results.³ The charcoal analysis (appendix C) is not

² These samples are registered with an object number and can be seen in appendix A (“wood” category of area 5 in the “type of remains” column).

³ This analysis has been the subject of two oral presentations (a colloquium by G.M.P.C.A “Archéométrie-Montpellier 2009” and a seminar by S.H.A.M.O organized by C. Michel at the Maison de l’Archéologie et de l’Ethnologie in

complete and only some results are included in order to clarify certain points.

The samples analysed were those that could be placed in a precise chronological framework. This framework depends on the relative dating of the *loci*, which is based on the artefact analysis, mainly pottery and coins. The analysis looked at two periods: the Nabataean period, from the 1st century BC to the 1st century AD, and the Late Antique periods between the 4th and 6th centuries. The earlier and intermediary periods are poorly represented in the artefact analysis so the samples associated with them were put aside.

Forty-three samples containing carpological remains were used in the study: twenty-four from the Nabataean period (with 4535 seeds and inflorescences identified) and nineteen from the Late Antique period (with 15957 carpological remains).

II. Plant foods and production methods at the site

The taxa identified were classed according to their nature (wild or cultivated) and their ecology, which allowed different classes to be differentiated (fig. 5). The cultivated plants are represented by three groups: cereals, pulses and fruits. The weeds comprised weeds, of cultivated origin (segetals) as well as those which proliferate on waste ground, along road sides etc. (ruderals). Finally, the desert plants belong to a flora typical of the Saharo-Arabian phytogeographical sphere and which are able to grow naturally in the Madâ'in Sâlih area.

II.1. Cultivated food products

Cultivated plants give direct information on the diet of past societies. The results are presented in histograms of frequency of the remains (fig. 6). These proportions were calculated taking into account the number of *loci* in which the taxon is present in relation to the total number of *loci* for the period in question. This type of presentation gives a picture of the importance of each species according to its spread on the site, closer to reality than if it were expressed as percentages. It can be seen that, apart from the fruit remains, the frequencies are not very different from one period to another.

Because the cereals were carbonized, they are quite damaged and it has not been possible to identify precisely many of the remains. Two cereals can be clearly distinguished: hulled barley and naked wheat. Cultivated barley (*Hordeum vulgare* L.) is a cereal adapted to use as human and animal food. The presence of some twisted grains indicated the consumption of a variety of six-row barley (*Hordeum vulgare* subsp. *hexastichum*), which is a variety usually found on Near Eastern sites of the classical period. The naked wheats (*Triticum aestivum/durum*) cannot be differentiated based on simple morphological criteria and several species were certainly included. These wheats are also commonly attested on other sites of the same period.⁴ The by-products of harvesting were well attested for both periods. These consisted of the chaff, that is the segments of rachis and the straw (stem, joint and fragments of roots), and bear witness to

Nanterre). A summary will be put on-line soon on the M.A.E. website).

⁴ Bouchaud 2007, Crawford 2006, Willcox 2003.

the different stages of cleaning needed to separate the by-products of cultivated grain harvests. The by-products could be used in different ways: as forage, organic temper for construction material, fuel etc.

Leguminous plants were poorly represented, which could be explained by the fact that those used as food by humans have less chance than cereals of being carbonized and thus of being preserved. Indeed, they were often boiled, for example lentils (*Lens culinaris* L.) and peas (*Pisum sativum* L.), whereas the cereals were often eaten roasted, which increases their chance of preservation. It is quite possible that other pulses, such as chick peas (*Cicer arietanum* L.) and vetch (*Vicia ervilia* (L.) Wild), were eaten at Madâ'in Sâlih, but unfortunately they have not been preserved.

The cultivated fruits were clearly dominated by remains of dates (*Phoenix dactylifera* L.) found in different forms: entire and fragmentary seeds, complete fruits and endocarps.⁵ The dates were accompanied by remains of other fruits: fig (*Ficus carica/sycomorus*), olive (*Olea europea* L.), pomegranate (*Punica granatum* L.), fragments of almond (cf.⁶ *Amygdalus comunis* L.) and grape (*Vitis vinifera* L.). These are typically Mediterranean species, whereas *Ziziphus* sp., a fruit-bearing species with yellow berries of the jujube family, is of East African origin. Dates, figs and the *Ziziphus* sp. were present in both periods, whereas olives, pomegranates and grapes were attested only in the Nabataean period and the (hypothetical) almond only in the Late Antique period.

Thus, plant food during the two periods investigated was composed of numerous cultivated plants including cereals, pulses and many fruit. Having established these first observations, it is necessary to try to define which were imported plants and which were cultivated on the site and how they were cultivated.

II.2. The Madâ'in Sâlih palm grove

The strong presence of date remains in nearly all the samples confirms the hypothesis, which had already been formulated by the agricultural potential analysis, of a production based on palm groves that would have already been present in Nabataean times and lasted into the later periods (4th to 6th centuries). The many charcoal remains of date palms found in the anthracological corpus support this hypothesis (fig. 7). Water from the Nabataean wells would have been used mainly for this. In the context of an arid climate, the methods employed to obtain the water needed to irrigate crops bears witness to a real desire to ensure major agricultural productions.

Ancient Greek and Latin sources insist on the importance of the date palms in the Nabataean economy. The descriptions of Theophrastus, mentioned by Pliny,⁷ show that the produce of the date palm was one of the principle resources of the southern parts of the ancient Near East. The

⁵ Thin membrane around the grain.

⁶ In botany, the prefix cf. indicates that the identification is not sure.

⁷ Theophrastus, *The study of plants*, II; Pliny, *Natural History*, XIII.26-50.

fruit is edible both fresh or dried and the juice and the sap can be used to make beverages that can be either alcoholic or non-alcoholic: “There are also wines, made from fruit [...]. First the wine made from date-palms, which is used by the Parthians and Indians and by the whole of the East, a peck of the rather soft dates called in Greek ‘common dates’ being soaked in two and a quarter gallons of water and then pressed.” (Pliny, *Natural History*, XIV.102). The trunks were used as construction beams, the leaves to cover roofs, make plaits and baskets: “... at the present day they are split up [the leaves] to make rope and plaited wicker-work and parasols” (Pliny, *Natural History*, XIII.30). Finally, the veins of the leaves were used as tooth brushes, the stones as animal fodder and the whole plant was often used as fuel. The multiple uses of the date palm still make this an attractive and useful plant today, as is clear from the numerous palm groves planted in the region.

The importance of palm grove cultivation is also underlined by the accounts of Charles Doughty and the Fathers Jaussen and Savignac.⁸ According to their descriptions, the vegetation at the end of the 19th and the beginning of the 20th century was rather desert-like. A few isolate date palm plantations survived on the archaeological site whereas the large palm groves were nearby. Fathers Jaussen and Savignac did not doubt that the site had been exploited in more ancient times and deplored the fact that it was not so at the time of their visit: “Therefore, we can see that if there were a bit more security and order in the region and if the work were to be encouraged, one could create plantations and gardens easily enough on this sandy plain. Let us hope that with the railway, civilization will come again in these parts and that the oasis and ruins of Heger will one day flower again.” (p. 107-108, translation I. Ruben).

The date palm is the fundamental component of the palm groves, but which other plants were cultivated alongside this major product? Studies on systems of production in oases⁹ reveal a three-tiered structure in palm groves: the date palms occupy the upper level, providing the shade and humidity needed to protect both the fruit trees, which are situated in the middle level, and the cultivated cereals, pulses, aromatics etc, situated at ground level.

The presence of numerous by-products from cereal harvesting found in the carpological samples from Madâ'in Sâlih allow us to say that cereals were cultivated on the site. There is no direct proof for the local cultivation of leguminous plants, but it is reasonable to imagine that there were small cultivation plots destined for this sort of crop. The presence of fruit trees is more delicate. Such trees need careful attention, which the cultivators perhaps reserved for the date palms. However, Hegra lies on the trade routes that linked the south of the Arabian Peninsula with the Levant and must surely have benefited from the exchange of goods, among which could have been Mediterranean fruits. Nevertheless, the hypothesis of local fruit production should not be entirely disregarded.

Comparison of the carpological remains (fig. 8) from Madâ'in Sâlih during the Nabataean

⁸ Doughty 1888, p. 205; Jaussen and Savignac 1909-1914, vol. II, p. 40, 107-108.

⁹ Tengberg, 1998; Tengberg and Newton, forthcoming.

and Late Antique periods with the plants cultivated in the palm groves described by Fathers Jaussen and Savignac, and with those found in the same palm groves today, is presented for completeness. It gives an idea of the local agricultural potential but is not scientifically valid. If one considers that water resources were more or less identical during the Nabataean period and the beginning of the 20th century, we see that the majority of plants found in our samples could, indeed, have been cultivated here.

The strongest arguments in favour of the local cultivation of these plants comes from the comparison of the carpological and anthracological remains. Indeed, it is admitted that the presence of both seeds and charcoal from the same species on a site is an indicator of local cultivation. Alongside the charcoal remains of the date palms already mentioned, the anthracological analysis (fig. 7) revealed the presence of charcoal from pomegranate trees and *Ziziphus* in both occupation periods, as well as olive tree charcoal from the Nabataean period which, given that seeds from these three species were also found (see above), suggests that these fruit trees were cultivated locally.

The histogram in figure 5 shows a greater diversity of fruit remains during the Nabataean period than in the Late Antique period which, leaving aside taphonomic and methodological reasons, might be explained by diminishing fruit resources in the more recent periods. This decrease could be the result of cultural choices favouring the cultivation of date palms to the detriment of secondary fruit cultivation, or of the reduction of trade exchanges of plants, if the fruits were imported.

Other plants linked to the palm groves could have been cultivated, not for their fruit but for their ornamental or practical qualities. Tamarisk (*Tamarix* sp.) is a tree that grows well on humid, saline soils. Today it is planted in hedges to protect crops from wind damage. The high proportion of tamarisk charcoal in the samples from both periods surely bears witness to a similar use in antiquity, and the branches could also be used as fuel. In addition, this tree is particularly appreciated as fodder for dromedaries. The identification of willow/poplar (*Salix/Populus*)¹⁰ is surprising. These two flood plain species grow only along water courses and are markers of high humidity. Other than as an import, their presence can only be explained by deliberate planting within the palm groves. The water used to irrigate the crops would have been sufficient to create ground favourable to their growth. We know from recent ethnographic examples observed among the bedouins of Petra, that willow and poplar wood are used to make tent pegs, which could explain why we find this type of wood in the residential area.

II.3. Wild plants

The study of diet in populations of the classical period tends to rely on the remains of cultivated plants, since they were the mainstay of the food supply. However, one should not neglect the analysis of wild plant remains, which are often well represented in the samples, and whose presence bears witness to diverse uses. The greatest difficulty in the study of wild plants is

¹⁰ These two species cannot be differentiated based only on observable anatomical detail.

the identification of the carpological remains. Indeed, the seeds are often very small and their morphological characteristics are not distinct enough to allow identification to species level, thus the majority of plants were identified only to genus, or even family, level. It was not easy to state the geographic origin of the plants in question, given that for the same genus or family, one can find plants growing both in the fields and naturally in the desert. The proposed classification (fig. 9) between weeds and desert taxa is, therefore, somewhat arbitrary; it is simply one possible classification of many possible classifications. Some of the plants present in seed form were also found as charcoal, such as some *Chenopodiaceae* and *Boraginaceae* (fig. 7).

The presence of wild plant remains can be explained in several ways. Some weeds are wild plants which grow in cultivated plots. They could have been separated from the cultivated assemblages during the various steps of post-harvest processing of the plants and eliminated by fire. The presence of Bermuda grass (*Cynodon dactylon* [L.] Persoon), a plant characteristic of humid areas,¹¹ is an additional argument in favour of the presence of irrigated crops at Madâ'in Sâlih.

Collecting fire wood could also explain the presence of certain woody species, such as acacia, amongst the seeds. Acacia was well represented in the anthracological corpus. Generally, the presence of charcoal in the excavated levels is linked directly to the use of wood as fuel. Other, non-woody plants, ingested by pastured animals, were found in the manure, which can also be used as fuel. Clover (*Trifolium* sp.) and rye grass (*Lolium* sp.) for example, are plants that are very appreciated by sheep and goats.

The majority of wild plants can bear witness to particular practices linked to medicinal, craft and dietary uses. As an example, for the list is long, oil can be extracted to heal wounds from the seeds of the bitter gourd (*Citrullus colocynthis* (L.) Schrad), a decumbent plant well-known in desert areas. The buds and fruit of the wild caper (*Capparis* sp.) produce edible capers and the leaves of the purslane-leaved aizoon (*Aizoon* cf. *canariense*) can be eaten as a salad.¹² *Aizoon* was only found in the more recent periods, in numerous samples (particularly in hearth 10061). However, it is generally well attested as a desert plant and should have been present during the Nabataean period. More generally, wild, weeds and desert plants were noticeably more present in the Late Antique periods than the Nabataean period, both in quantity of carpological remains (fig. 5) and in diversity of species (fig. 8). This tendency is the same for the anthracological corpus (fig. 7), where the acacia and chenopod charcoal represent a greater proportion in the Late Antique than in the Nabataean period. This could signify a change in custom leading to a more frequent use of wild plants, but it is hard to say if this was a episodic change or a general tendency. Nevertheless, the frequency of several plants in the Late Antique period – *Astragalus/Trigonella*, *Fabaceae*, *Poaceae*, *Aizoon* cf. *canariense* and *Citrullus colocynthis* – would rather seem to indicate a fairly extended phenomenon.

¹¹ Herveux 2007.

¹² Ruben 2006, Zohary 1973.

Conclusions

The agricultural resources of the site of Madâ'in Sâlih revolved mainly around the cultivation of date palms, and they probably constituted an important economic resource which could even have been the object of medium and long distance trade. The secondary produce, cereals, pulses and fruit, would certainly have been used mainly as food for the local populations. One can assume that certain plant products were imported to complete the dietary requirements. At the present time, the carpological and anthracological study strongly points towards the cultivation of pomegranate and *Ziziphus* in both periods of occupation on the site and of olives at least during the Nabataean period. The continuation of the charcoal analysis should determine how the fruit resource was acquired.

Questions relating to the qualitative results remain unanswered at present. The differences observed between the two periods of occupation on the site – the disappearance of certain fruit trees and the increase in wild plants – are perhaps not significant. Only the study of a greater number of samples will corroborate or refute the hypotheses put forward.

Bibliography

- Bouchaud 2007: Bouchaud C., *Les relations hommes-plantes en contexte semi-aride aux périodes classiques et islamiques. Étude carpologique des sites de Bosra (Syrie) et Khirbet edh-Dharrah (Jordanie)*. Master's thesis, Université Paris 1 Panthéon-Sorbonne (supervision, F. Villeneuve).
- Crawford 2006: Crawford P., "The plant remains", in S. T. Parker, *The Roman Frontier in Central Jordan, Final Report on the Limes Arabicus Project, 1980-1989*, Washington: Dumbarton Oaks, p. 453-461.
- Doughty 1888: Doughty C., *Voyage dans l'Arabie déserte*, Translated by J.-Cl. Reverdy. Paris: Karthala.
- Herveux 2007: Herveux L., *Le phénomène agricole à l'Âge du Bronze au Proche-Orient (3000-1200 av. J.-C.)*. PhD thesis, Université Paris 1 Panthéon-Sorbonne (supervision, S. Thiébault).
- Jaussen and Savignac 1909-1914: Jaussen A. and Savignac R., *Mission archéologique en Arabie. I. De Jérusalem au Hedjaz, Meda'in Saleh. II. El-'Ela, d'Hégra à Teima, Harrah de Tebouk*, 2 volumes, Paris.
- Nehmé, al-Talhi, Villeneuve 2009: Nehmé L., al-Talhi D. et Villeneuve F. (eds), *Hegra I. Report on the First Excavation Season at Madâ'in Sâlih, Saudia Arabia, 2008*, Riyadh: Saudi Commission for Tourism and Antiquities.
- Pliny / Rackham H. 1945. *Natural History*. Volume IV. Text established and translated by H. Rackam. London: Heinmann.
- Ruben 2006: Ruben I., *Plants and Animals of Petra*. Amman: Petra National Trust.
- Tengberg 1998: Tengberg M., *Paléoenvironnements et économie végétale en milieu aride. Recherches archéobotaniques dans la région du Golfe arabo-persique et dans le Makran pakistanaï (4^{ème}*

millénaire av. notre ère-1^{er} millénaire de notre ère). PhD thesis, Université Montpellier II (supervision, J.-L. Vernet).

Tengberg and Newton forthcoming: Tengberg M. and Newton C., *Origine et évolution de la phoeniciculture au Moyen-Orient et en Égypte*.

Theophraste / Amigues S. 1989. *Recherches sur les plantes*. Volume II (Books III-IV). Text established and translated by S. Amigues. Paris: Collection des Universités de France, Les Belles Lettres.

Willcox 2003: Willcox G., “L’économie végétale à Bosra et à Si‘ : résultats d’analyse de restes végétaux carbonisés des périodes romaine, byzantine et islamique”, in J. Dentzer-Feydy, J.-M. Dentzer and P.-M. Blanc, *Hauran II*. Beirut: Institut français d’archéologie du Proche-Orient, BAH 164, p. 177-184.

Zohary 1973: Zohary M., *Geobotanical Foundations of the Middle East*, 2 vol. Stuttgart: Fischer.

Appendix 1. Samples exported in 2009

| <i>Locus</i> number | Collecting method | Liters sampled | Type of conservation | Type of reste |
|---------------------|-------------------|----------------|----------------------|---------------|
| 10017 | manual | | carbonization | charcoal |
| 10049 | manual | | carbonization | charcoal |
| 10123 | manual | | carbonization | charcoal |
| 10124 | manual | | carbonization | charcoal |
| 10125 | manual | | carbonization | charcoal |
| 10131 | manual | | carbonization | charcoal seed |
| 10151 | flotation | 3+3l | carbonization | charcoal seed |
| 10152 | flotation | 4l | carbonization | charcoal seed |
| 10152 est | flotation | 3l | carbonization | charcoal seed |
| 10153 | flotation | 3l | carbonization | charcoal seed |
| 10155 | flotation | 1,5l | carbonization | charcoal seed |
| 10156 | flotation | 14l | carbonization | charcoal seed |
| 10157 | flotation | 5l | carbonization | charcoal seed |
| 10158_P01 | flotation | 2l | carbonization | charcoal seed |
| 10159 | flotation | 7l | carbonization | charcoal seed |
| 20026 | flotation | 55l | carbonization | charcoal seed |
| 23006 | flotation | 6l | carbonization | charcoal seed |
| 23017 | flotation | 6l | carbonization | charcoal seed |
| 25003 | flotation | 7 | carbonization | charcoal seed |
| 25004 | flotation | 35l | carbonization | charcoal seed |
| 25005 | flotation | 13 | carbonization | charcoal seed |
| 25006 | flotation | 14l | carbonization | charcoal seed |
| 25007 | flotation | 2,5l | carbonization | charcoal seed |
| 25011 | flotation | 5l | carbonization | charcoal seed |
| 25012 | flotation | 23l | carbonization | charcoal seed |
| 25013 | flotation | 5l | carbonization | charcoal seed |
| 25021 | flotation | 5l | carbonization | charcoal seed |
| 25023 | flotation | 6l | carbonization | charcoal seed |
| 25029 | flotation | 5l | carbonization | charcoal seed |
| 32032 | manual | | carbonization | charcoal |
| 32033 | manual | | carbonization | charcoal |
| 32102 | manual | | carbonization | charcoal |
| 32103 | manual | | carbonization | charcoal |
| 32105 | manual | | carbonization | charcoal |
| 32125 | flotation | 30 | carbonization | charcoal seed |
| 50012 | manual | | carbonization | charcoal |
| 50045_W06 | manual | | desiccation | wood |

| | | | | |
|-----------|---------|------|---------------|---------------|
| 50053_W15 | manual | | desiccation | wood |
| 50082_W01 | manual | | desiccation | wood |
| 50082_W01 | manual | | desiccation | wood |
| 50104_W01 | manual | | desiccation | wood |
| 50106 | sieving | 2,4l | carbonization | charcoal |
| 50121 | sieving | 4,2l | carbonization | charcoal seed |
| 50125 | sieving | 5,2l | carbonization | charcoal |
| 50126 | sieving | 3,1l | carbonization | charcoal |
| 50126 | manual | | carbonization | charcoal |
| 50130 | manual | | desiccation | seed |
| 50133 | manual | | desiccation | seed |
| 50134_W01 | manual | | desiccation | wood |
| 50147 | sieving | 4,1l | carbonization | charcoal |
| 50156 | manual | | carbonization | charcoal |
| 50157 | manual | | carbonization | charcoal |
| 50162 | sieving | 4,2l | carbonization | charcoal |
| 50168 | manual | | desiccation | seed |
| 50170_W01 | manual | | desiccation | wood |
| 50170_W02 | manual | | desiccation | wood |
| 50174_W01 | manual | | desiccation | wood |
| 50187 | sieving | 5l | carbonization | charcoal |
| 50192 | manual | | desiccation | seed |
| 50201 | manual | | desiccation | seed |
| 50209 | sieving | 7l | carbonization | charcoal |
| 50219_W01 | manual | | desiccation | wood |
| 50223_W01 | manual | | desiccation | wood |
| 50226 | manual | | desiccation | seed |
| 50226_W01 | manual | | desiccation | wood |
| 50226_W02 | manual | | desiccation | wood |
| 50226_W03 | manual | | desiccation | wood |
| 50226_W04 | manual | | desiccation | wood |
| 50226_W05 | manual | | desiccation | wood |
| 50226_W06 | manual | | desiccation | wood |
| 50226_W07 | manual | | desiccation | wood |
| 50227_W01 | manual | | desiccation | wood |
| 50228_W01 | manual | | desiccation | wood |
| 50228_W02 | manual | | desiccation | wood |
| 50229_W01 | manual | | desiccation | wood |
| 50229_W02 | manual | | desiccation | wood |
| 50229_W02 | manual | | desiccation | wood |
| 50230_W01 | manual | | desiccation | wood |
| 50231_W01 | manual | | desiccation | wood |

| | | | | |
|-----------|-----------|------|---------------|---------------|
| 50232_W01 | manual | | desiccation | wood |
| 50232_W01 | manual | | desiccation | wood |
| 50233_W01 | manual | | desiccation | wood |
| 50233_W01 | manual | | desiccation | wood |
| 50234_W01 | manual | | desiccation | wood |
| 50235_W01 | manual | | desiccation | wood |
| 50235_W01 | manual | | desiccation | wood |
| 50240 | manual | | desiccation | seed |
| 50240_W01 | manual | | desiccation | wood |
| 50240_W03 | manual | | desiccation | wood |
| 50240_W04 | manual | | desiccation | wood |
| 50244_W01 | manual | | desiccation | wood |
| 50244_W01 | manual | | desiccation | wood |
| 80000 | manual | | carbonization | charcoal |
| 80003 | manual | | carbonization | charcoal seed |
| 80007 | manual | | carbonization | charcoal |
| 80010 | manual | | carbonization | charcoal |
| 80014 | flotation | 0,3l | carbonization | charcoal seed |
| 80014 | manual | | carbonization | charcoal |
| 80016 | manual | | carbonization | charcoal |
| 80017 | manual | | carbonization | charcoal |
| 80022 | flotation | 3l | carbonization | charcoal seed |

Appendix B, at the end of the report, A3 format

Appendix C. Anthracological results

| | | Nabatean | | | | | | | | | | Late antique | | | | | | | | | | | | | | |
|----------------|--|----------|-----|-----|------|-----|-----|-----|----|----|-----|--------------|----|----|-----|-----|-----|-------|------|------|-----|--|----|--|--|-------|
| | | 10 | | | | 23 | | | 25 | | | 32 | | | 60 | | | Total | 10 | | | | 25 | | | Total |
| | | 123 | 124 | 152 | 152E | 6 | 4 | 21 | 12 | 25 | 6 | 17 | 49 | 96 | 125 | 151 | 131 | 157 | 7(1) | 7(2) | | | | | | |
| Arecaceae | <i>Phoenix dactylifera</i> | | | | | 1 | 37 | 6 | 15 | | 38 | 8 | 13 | 27 | | 4 | | 3 | 14 | | 48 | | | | | |
| | petiole | | | 12 | 32 | 51 | 91 | 6 | | | 207 | | | | | 8 | | 4 | 50 | 29 | 112 | | | | | |
| | trunk | 2 | | | | 51 | 51 | 11 | 21 | | 85 | 1 | | | | | | 4 | 54 | 61 | 120 | | | | | |
| Boraginaceae | limb | | | 7 | 5 | 5 | 5 | 2 | 5 | | 29 | | | | | 3 | | 2 | 14 | | 19 | | | | | |
| | | | | | | 4 | | | | 4 | | | | | | | | 0 | | | 1 | | | | | |
| | <i>Echium</i> sp. | 1 | | | 2 | | | | | | 3 | | | | | | 1 | | | | 1 | | | | | |
| Chenopodiaceae | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Euphorbiaceae | <i>Euphorbia</i> sp. | 1 | 8 | 24 | 14 | 19 | 3 | 17 | 21 | | 107 | 20 | 13 | 2 | 1 | 16 | 1 | 50 | 4 | 1 | 108 | | | | | |
| Fabaceae | <i>Acacia</i> | | | 2 | 2 | 25 | | 23 | | 0 | | | | | | 3 | | | | | 3 | | | | | |
| | <i>Acacia</i> 1-série | | | | | | | 4 | | 52 | 11 | 2 | | 3 | 37 | | | 10 | 2 | | 65 | | | | | |
| Oleaceae | cf. <i>Acacia</i> | | | | | 2 | | 6 | | 4 | 8 | 1 | | | | 1 | | 4 | | | 6 | | | | | |
| | <i>Olea europaea</i> | | | | | | | 10 | | 10 | | | | | | | | | | | 0 | | | | | |
| Punicaceae | <i>Punica granatum</i> | | | | | | | 2 | | 2 | 18 | | | | | | | | | | 0 | | | | | |
| Rhamnaceae | cf. <i>Punica granatum</i> | | | | | | | 3 | | 15 | 2 | 2 | 1 | | | | | 1 | | | 1 | | | | | |
| | <i>Ziziphus</i> cf. <i>spina-christi</i> | | | | | | 1 | 1 | | 2 | 2 | | | | | 9 | | | | | 12 | | | | | |
| Rosaceae | cf. <i>Ziziphus</i> sp. | | | | | | 3 | | | 3 | 3 | | | | | 1 | | 1 | | | 2 | | | | | |
| | cf. <i>Prunus</i> sp. | | | | | | | | | 0 | 0 | | | | | 1 | | | | | 1 | | | | | |
| Rubiaceae | cf. <i>Asperula/Gallium</i> | | | | | | | 1 | | 1 | 1 | | | | | | | | | | 0 | | | | | |
| Salicaceae | <i>Salix/Populus</i> | | | | | 1 | 1 | 1 | | 3 | 3 | 1 | | | | | | | | | 1 | | | | | |
| | cf. <i>Salix/Populus</i> | | | | | 1 | | | 1 | 2 | 2 | | | | | | | | | | 1 | | | | | |
| Solanaceae | <i>Lycium</i> sp. | | | | | 3 | | | | 3 | 3 | | | | | | | | | | 1 | | | | | |
| Tamaricaceae | <i>Tamarix</i> sp. | 1 | | 1 | | | 1 | 56 | 4 | 54 | 117 | 18 | 17 | 1 | 4 | 8 | 1 | 1 | 4 | 17 | 71 | | | | | |
| Tiliaceae | cf. <i>Tamarix</i> sp. | | | | | | | 3 | | 1 | 4 | | | | | | | | | | 1 | | | | | |
| | <i>Grewia</i> sp. | | | | | | | | | 1 | 1 | | | | | 1 | | | | | 1 | | | | | |
| Angiosperm | cf. <i>Grewia</i> sp. | | | | | | | | | 0 | 0 | | | | | | | | | | 1 | | | | | |
| | | | | 3 | 4 | 7 | | | | | 14 | 1 | | | | | | | | | 1 | | | | | |
| Monocotyledon | | | | 10 | 24 | 22 | 17 | 28 | 23 | 4 | 5 | 4 | 1 | | | | | | | | 56 | | | | | |
| Indeterminate | | 4 | 8 | 59 | 84 | 141 | 210 | 174 | 90 | 59 | 22 | 64 | 50 | 30 | 8 | 115 | 3 | 93 | 160 | 108 | 631 | | | | | |

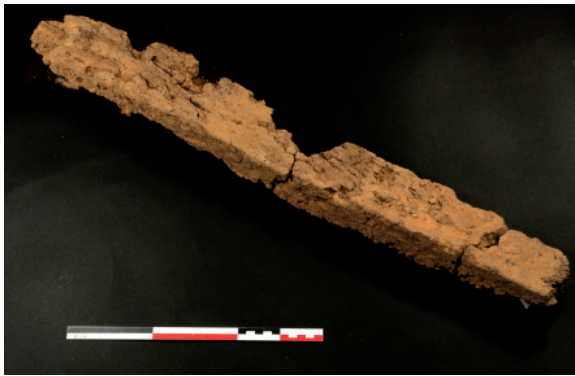


Fig. 1 Pieces of decomposed wood, 50168_W01



Fig. 2 Door in the old town of al-'Ulâ

| | | | 50130 | 50133 | 50168 | 50226 | 50240 | 50121 | 50201 | 50192 |
|-----------------|---|----------|----------|-------|---------|-------|-------|-------|-------|-------|
| Areaceae | <i>Hyphaene thebaica</i> (dour palm) | seed | | | 1(VS01) | | | | | |
| | <i>Phoenix dactylifera</i> L. (date palm) | seed | 2 | | | 1 | 1 | | 1 | |
| | | endocarp | 2 (VS01) | 1 | | | | | | |
| Vitaceae | <i>Vitis vinifera</i> (grape) | | | | | | | 4 | | |
| | Undetermined | | | | | | | | | 7 |

Fig. 3. Carpological results from tomb IGN 117 (the numbers in brackets are the references of the photographs, which can be consulted in the project database of object photographs)

| Sampling method | | Manual | Flotation |
|--------------------------|-----|--------------|-----------------|
| Nb of removed samples | | 48 | 70 |
| | Sum | = 118 | |
| Category remains | | carpological | anthracological |
| Nb of affected samples | | 57 | 111 |
| Nb of studied samples | | 57 | 13 |
| Nb of samples in context | | 43 | 11 |

Fig. 4 Table of the samples

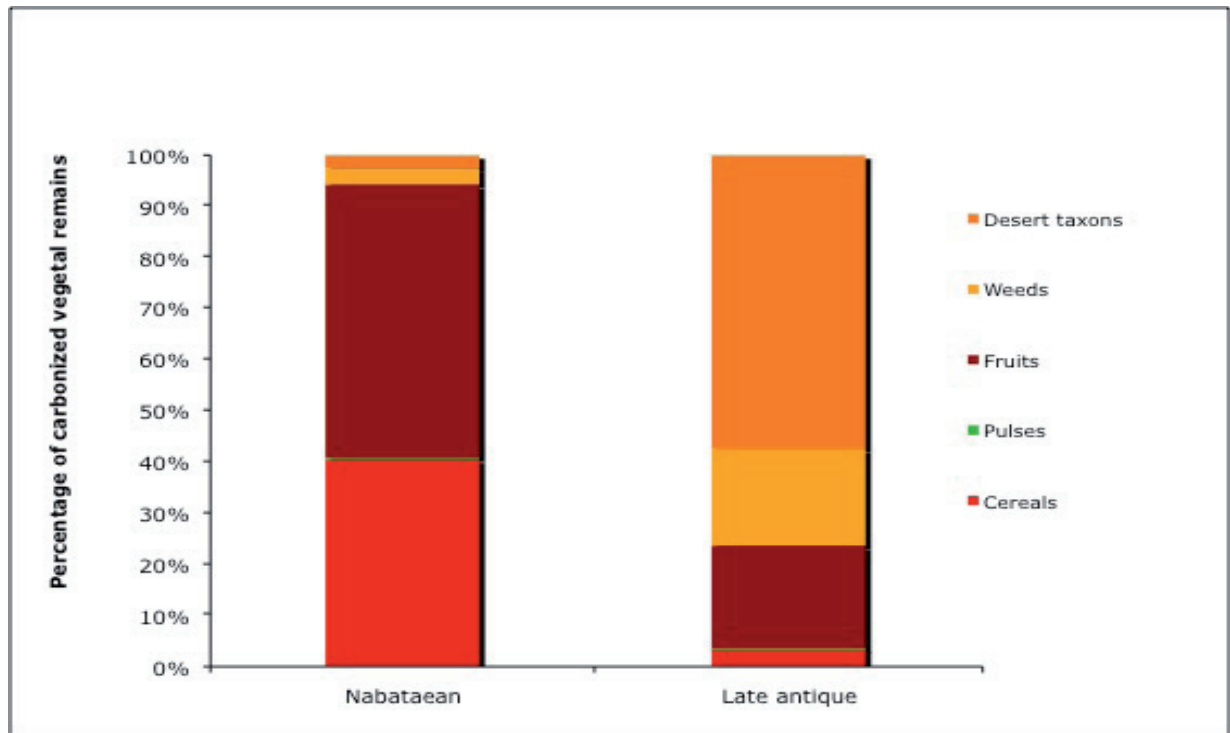


Fig. 5 Histogram of the plant classes during the Nabataean and Late Antique periods

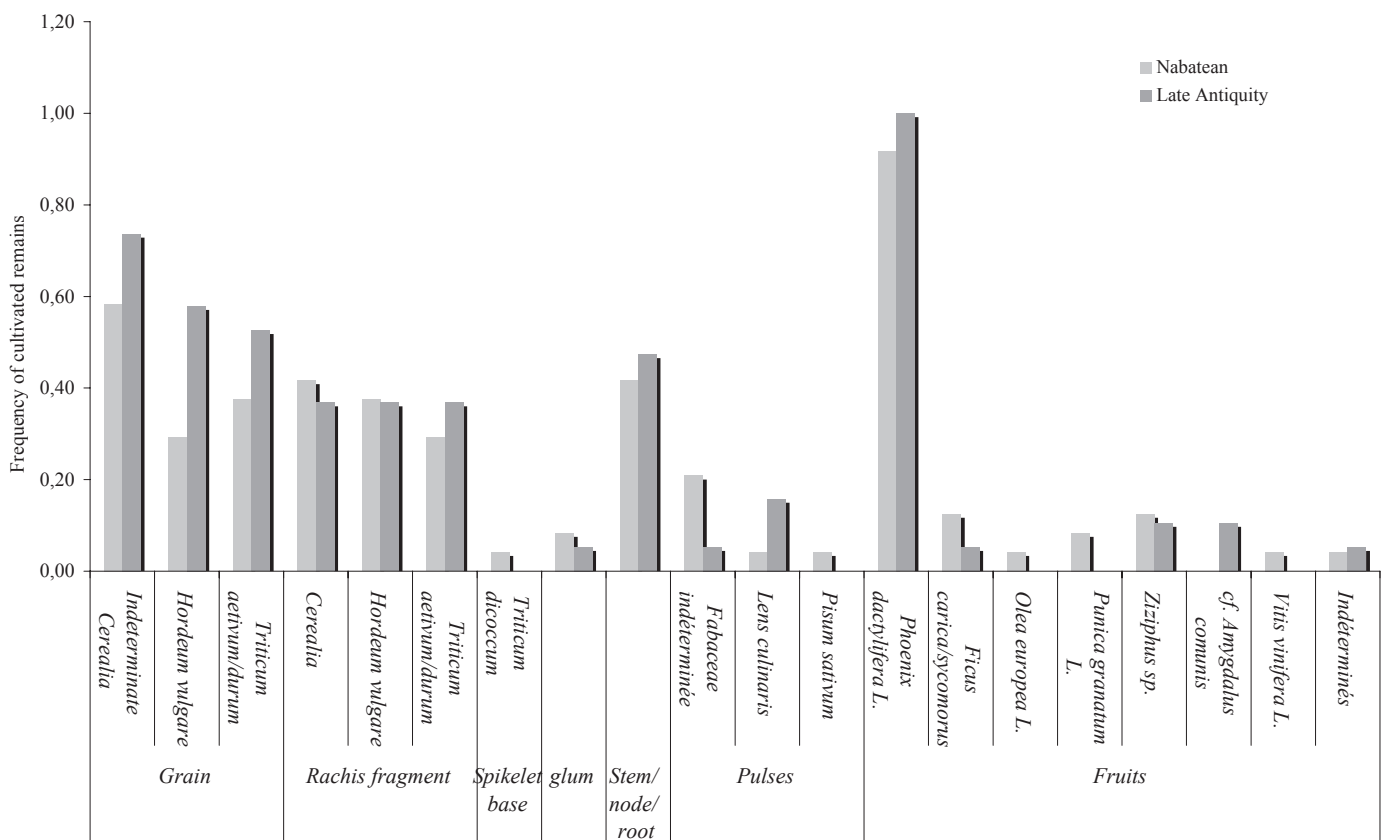


Fig. 6 Distribution of the cultivated remains (number of samples in which the taxon is present in relation to the total number of samples per period)

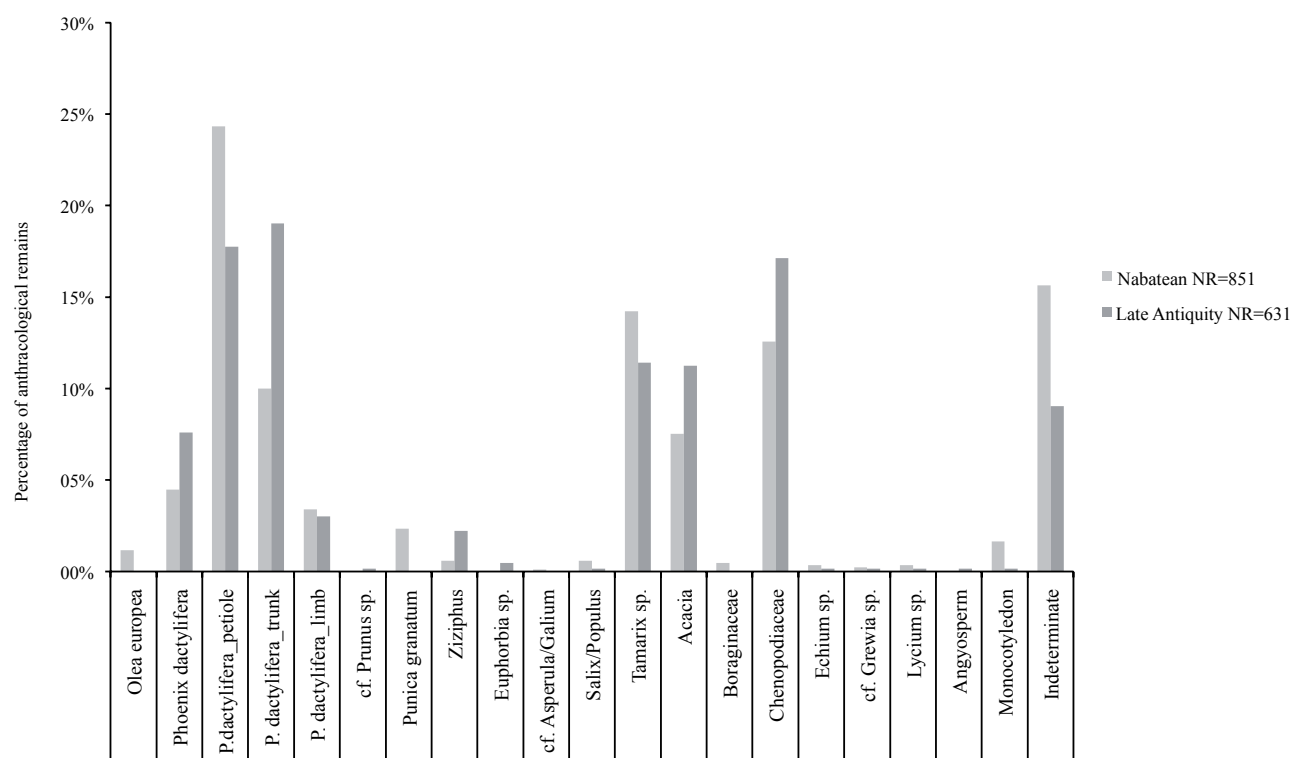


Fig. 7 Percentage of each taxon during the Nabataean and Late Antique periods

| <i>Cultivated carporemaines of Madā'in Sâlih Nabatean and Late Antiquity times</i> | <i>Jausсен et Savignac, 1907 Doughty, 1888</i> | <i>Present palm grove, february 2009</i> |
|--|--|--|
| Date | Date | Date |
| Fig | Fig | Fig |
| Grape | Grape | Grape |
| | | Olive |
| Pomegranate | Pomegranate | Pomegranate |
| Almond ? | | |
| Ziziphus | | Ziziphus |
| | Peach | Apricot |
| Naked wheat | Wheat | Naked wheat |
| Hulled barley | Barley | Barley |
| Lentil, pea | | Lentil, chick-pea |
| | Lemon | Lemon, orange, kumquat |
| | Quince | |
| | Watermelon, melon | |
| | Onion | Onion, garlic |
| | | Coriander |
| | Tomato, eggplant, sweet pepper | Tomato, eggplant, sweet pepper |

Fig. 8 Comparison of the carpological remains with the lists of cultivated plants in the region's palm groves at the end of the 19th and beginning of the 20th century and today

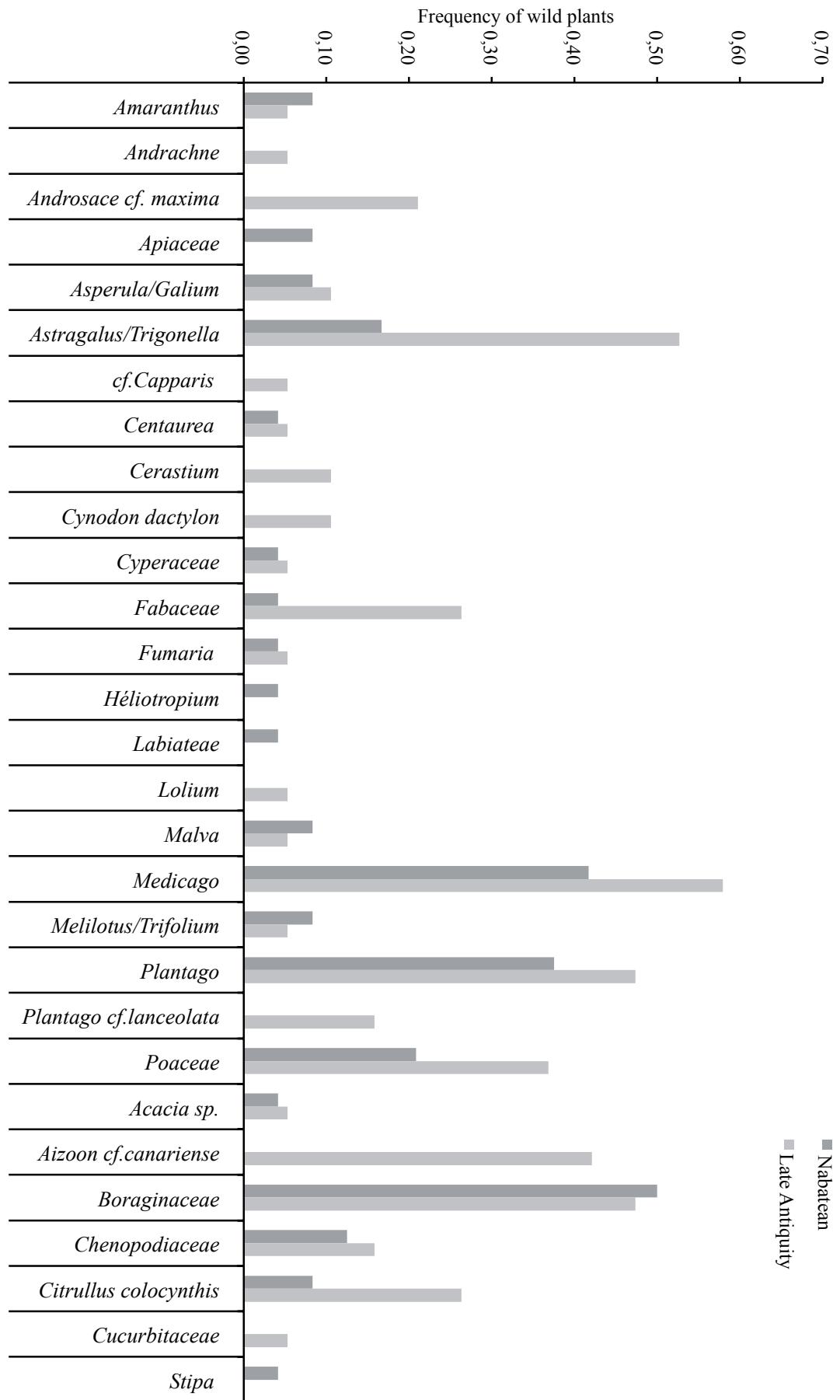


Fig. 9 Distribution of wild plants during the Nabatean and Late Antiquity periods. Carpological results.

Pottery Study

Pottery Study

Yvonne Gerber and Caroline Durand

In 2009, excavations at Madâ'in Sâlih took place in four different areas, either as a continuation of the fields already opened in 2008 or as new areas opened in 2009:

1. The residential area, in which excavations in Areas 1, 2 and 32 continued (see the reports of G. Charloux for Area 1, Z. T. Fiema, M. al-Hâjirî and J. Rohmer for the various trenches of Area 2, and F. Villeneuve for Area 32) while Areas 7 and 8 were newly opened (see the reports of D. al-Talhi and S. Marion de Procé respectively);
2. The monumental rock-cut tomb tomb IGN 117 (*loci* numbered as 50000, 50100, 50200);
3. The surroundings of the Jabal Ithlib, structure Ith 68 (*loci* numbered as 60300);
4. The surroundings of the Qasr al-Bint area, structure QB 6¹ (*loci* numbered as 60400).

The recording and reading of the pottery was again the responsibility of Caroline Durand (January 13th – February 16th 2009) and Yvonne Gerber (February 7th – 28th 2009). The pottery originated from 153 stratified *loci* and was recorded using the same *FileMaker Pro* 8 database as during the 2008 season. 328 pottery sherds were isolated and recorded in detail. They were photographed by Serge Gaiani and a selection of sherds from the 2008- and 2009-seasons were drawn by Sylvie Eliès. Some vessels from the 2008-campaign, mainly from *loci* 10016 and 10017, were restored by François Bernel to complete vessel forms.

In this report, we provide a short overview of this year's results per area and per trench. It will be followed by a selection of Late Byzantine / transitional – Early Islamic pottery from Area 1 in the urban centre, based on the drawings from the 2008 season.²

¹ QB 6 is located between the Qasr al-Bint and the residential area.

² Concerning the tools for the classification and datation of the pottery, see the introduction in the pottery report from the 2008 season: Durand and Gerber 2009, p. 285.

Urban Centre and City Wall

Area 1 (loci 10100, excavator G. Charloux)

In 2009, none of the trenches opened in this area went down to bedrock and most of the *loci* were located rather close to the surface. They presented a huge amount of pottery from the (?) 6th–7th–8th centuries AD. The date is suggested on the basis of vessel form *concepts* (e.g., 10146_P06, fig. 1) and decoration systems (e.g., 10133_P01, fig. 2; 10133_P02, fig. 3; 10146_P03, fig. 4) as they are also known in Transjordan and Palestine. A *local* chrono-typological system for this rather later occupation phase does not exist yet. We therefore had to rely, for dating, on “external” systems. Some complete vessels of the 2009 season doubtlessly originate from the Late Byzantine / transitional period (e.g., 10158_P01, fig. 5).

Important note: we prefer to avoid precise dates such as 6th and/or 7th and/or 8th century AD, because at the current stage of research, we cannot narrow down dates to exact centuries or even decades. Instead, we prefer to use the common and generally accepted terms “Byzantine”, “Late Byzantine”, “transitional” and “Early Islamic” in order to attribute the pottery to a certain time range which is defined by form, decor and style, rather than proffering misleadingly precise dates. In the archaeology of the Near East, especially in Jordan and the former area of the Nabataeans, scholars agree upon the following terms³ to generalise time ranges:

- **Byzantine:** 4th century (from 323 AD onwards, Constantine the Great declared himself a Christian) to 6th century AD;
- whereas the 6th century to earlier 7th century AD is more precisely called **Late Byzantine**;
- although the region was conquered 636 AD (battle at the Yarmouk river) by the Muslims, the pottery tradition did not change overnight, there is a so-called **transitional** period of almost a century;
- and only in the 8th century new pottery traditions – so-called **Early Islamic** – (from Late Umayyad and Abbasid periods onwards) are manifest.

Nevertheless, some of the excavated *loci*, in trench H, opposite (north) from the squares A-G with the latest occupation phases, showed also or exclusively a rather huge amount of Nabataean fine and common ware pottery (*loci* 10120, 10122, 10123 and 10124): e.g., fine ware bowl with two red, parallel wavy lines in its interior (10124_P01: fig. 6);⁴ fine ware round base with red decor (10124_P02: fig. 7). These are all floors layers.

Area 2

Trench C (loci 22100, excavator J. Rohmer)

Further excavation was undertaken in trench C (*loci* 22000, opened in 2008) which yielded a

³ MacDonald 1992, p. xii. See also Gerber 2008.

⁴ It is yet uncertain, if this bowl has to be attributed to Schmid’s phase 1 or decor phase 2a. For Nabataean fine ware, see: Schmid 1996 and Schmid 2000.

few *loci* numbered in 2009 as 22100. Two sherds from *locus* 22101 will be mentioned, showing a Late Hellenistic and/or first half of the 1st century AD context:

- Nabataean fine ware bowl rim, comparable to Schmid's group 6 of unpainted bowls, dated to the second half of the 1st century BC – first quarter of the 1st century AD (22101_P03, fig. 8);
- Nabataean fine ware bowl with '2-red-lines' decor in its interior (22101_P04, fig. 9).⁵

Trench F (*loci* 25000, excavator J. Rohmer)

Trench F (25000) was opened in 2009 and showed the same time range as trench C (22000). Examples from earlier contexts (Late Hellenistic – Early Roman periods) are:

- a Nabataean fine ware bowl with small red lines on the interior of the rim (25003_P11, fig. 10);
- a Nabataean fine ware bowl with '2-red-lines' decor in its interior (25021_P01, fig. 11);
- jars (25003_P03, fig. 12; 25031_P01, fig. 13);
- cooking pots (25033_P01, fig. 14);
- common ware bowls (25003_P08, fig. 15).

A range of *loci* suggested a provisional time range of Roman / Late Roman periods (2nd / 3rd century AD). A later date, from the 4th century AD onwards, can most probably be excluded for these *loci*: e.g.:

- small pots (25004_P09, fig. 16);
- cooking pots (25004_P12, fig. 17; 25006_P01, fig. 18);
- jars (25017_P02, fig. 19);
- juglets (25015_P01, fig. 20);
- bowls (25015_P04, fig. 21; 25017_P01, fig. 22; 25023_P01, fig. 23).

1 or 2 *loci* might show pottery material from a later time range (Late Byzantine / transitional period): e.g., a cooking pot (25007_P01, fig. 24).

Very typical for Late Roman contexts are common ware bowls with internal painting. The patterns are always very simple (25008_P03, figs 25-26, with two painted crosses above each other in its interior). These painted common ware bowls were popular in the 2nd / 3rd century AD-contexts in Petra⁶. Bowl 25015_P16 (fig. 27) is even imported from Petra.

Trench D (*loci* 23000, excavator M. al-Hâjirî)

Trench D (23000) is situated to the south of trench B (*loci* 21000, opened in 2008). The pottery finds can almost all be dated to the Late Hellenistic – Early Roman period, among those:

- several Nabataean fine ware sherds, some with the '2-red-lines' decor in their interior (23001_P08, fig. 28);

⁵ See pottery report from the 2008 season: Durand and Gerber 2009, p. 291.

⁶ See Gerber 2001, p. 8; 10, fig. 1.

- a glazed handle with flat section, being most probably of a so-called “Parthian” jug (23017_P01, fig. 29);
- an imported jar from Petra (23004_P06, figs 30 & 31);
- a typical (Late) Hellenistic jar rim form (23005_P02, fig. 32).

Trench E (*loci* 24000, excavator Z. T. Fiema)

Trench E (24000), which is the extension of trench A (*loci* 20000, opened in 2008) to the south, was opened to follow the structures found during the previous campaign. There were few pottery finds in 2009: several fragments of bowls with ‘2-red-lines’ decor in their interior (from Late Hellenistic / Early Roman contexts); local pithos (24007_P01, fig. 33, Late Hellenistic / Early Roman period); etc.

An oven (*locus* 20026, excavated in 2009) yielded only some burnt body sherds which did not lead to suggest any date.

Area 7 (*loci* 70000, excavator D. al-Talhi)

Area 7 is an extension of previous excavations undertaken by D. al-Talhi. This area yielded pottery mostly from the 1st century AD (e.g., glazed body sherd, probably of “Parthian” fabric, 70001_P01; and jar 70008_P02, fig. 34).

However, some of those *loci* are partially mixed with some later elements:

- cooking-pot probably imported from Petra: 70009_P05, fig. 35, which may be Late-Roman / Byzantine;
- jars: 70004_P02, fig. 36; 70009_P04, fig. 37, which may be Byzantine.

Among the above finds, we may mention an imported amphora handle with a (light) red fabric and large dark grey inclusions (70009_P01, fig. 38) which might be a Peacock Class 47 amphora (“Kapitän II”)⁷ being produced in the Aegean area between the (late 2nd –) 3rd – 4th century AD.

Area 8 (*loci* 80000, excavator S. Marion de Procé)

Most of the *loci* of this large area were more or less just below the surface, no deep soundings were carried out during in 2009. The pottery material coming from below the surface is therefore quite mixed, showing features from the 1st / 2nd century AD as well as from the Byzantine / Late Byzantine period. Examples are cooking pots (80014_P02, fig. 39; 80022_P02, fig. 40, the latter with incised rounded wavy lines crossing each other between two bunches of incised horizontal lines on its shoulder). The rim fragments are mostly very small, indicating that they were moved before being deposited. Where the *loci* are from slightly deeper levels the time range changes quite quickly to the 1st / 2nd century AD (e.g., Nabataean fine ware rim sherd, Schmid’s group 5 of unpainted bowls (80017_P03); Nabataean painted fine ware rim sherd with ‘2-red-lines’ decor in its interior (80021_P03);

⁷ Peacock 1986, p. 193-195.

cooking pot, imported from Petra (80003_P03, fig. 41); etc.).

The pottery spectrum of trench F in Area 2 (*loci* 25000), which we address as Roman / Late Roman period, cannot be traced in this field.

The upper side of a lamp was found in *locus* 80017 (80017_P01, fig. 42), but no good parallel for it has yet been found.

Area 32: city Wall / “Northwest tell” (loci 32000-321000, excavator F. Villeneuve)

The excavation continued in the area of the so-called “Northwest tell”. It yielded, as expected, a few small sherds from the 1st century AD such as the jar with pinched rim 32033_P01, fig. 43. A new trench was opened 10 m north of the 2008 sounding, on the northern slope of the tell (*loci* 32100). It yielded sherds from the same time range: jars with pinched rims seem to be typical of the 1st century AD (32102_P02, fig. 44; 32105_P05, fig. 45).

The monumental rock-cut tomb IGN 117

(excavators: I. Sachet, N. Delhopital)

The excavation of tomb IGN 117 continued in 2009. The suggested occupation range based on last year’s pottery finds (second half of the 1st century BC to the beginning of the 2nd century AD) is not contradicted by this year’s pottery assemblage. Most of those vessels are imported:

- one Nabataean fine ware body sherd probably from Schmid’s decor phase 3a (second-third quarter of the 1st century AD): 50206_P01, fig. 46;⁸
- a globular Nabataean fine ware juglet with ring base (half profile preserved), very thin-walled, and with rouletted pattern on its exterior (50120_P01, figs 47 & 48), imported from Petra;⁹
- more sherds could be added to the glazed jug (of so-called “Parthian” fabric) of which some sherds were found in 2008 (= 50095_P02).¹⁰ The jug is now recorded and labelled as 50110_P01, figs 49 & 50. The source of import is still unknown;
- a ring base of a jar, imported from Petra (50180_P01, fig. 51).

The small, thin-walled, complete pot (50220_P01) burst when excavated. The fabric is very brittle. Pending further investigations, a *prima-facie* off-the-cuff hypothesis may be that the current brittle state of the ceramic may be due to the long-term chemical effects of the accumulated decomposing bodies in the burial chamber (fig. 52). It is not clear if the pot was imported or produced locally, however it might be imported.

One common ware bowl (50108_P01, fig. 53) is certainly of local fabric. Traces of two thick red painted lines probably crossing in the bottom of the bowl are still visible on the interior. This pattern may recall at first look the “spirit” of the Nabataean painted bowls from Schmid

⁸ Schmid 1996, p. 107, fig. 700; Schmid 2000, fig. 90.

⁹ Only rouletted decoration pattern in the lower part of a closed vessel, comparable to Schmid 2000, fig. 371 (lower part of the form G 1f 405). Fine rouletted decoration on very thin-walled pottery is rather typical of Schmid’s phase 3 (second quarter of the 1st century – first quarter of the 2nd century AD).

¹⁰ See pottery report from the 2008 campaign: Durand and Gerber 2009, p. 288 and fig. 17; p. 296.

phase 1, but both the fabric and the decoration are much cruder than the Petra productions and resemble more the plain bowl with everted rim, rounded lip and flat base from the late 1st century BC / 1st century AD which is of local production.

The Jabal Ithlib area

In 2009, this area corresponds to a small structure registered as Ith 68 (Area 6, *loci* 60300, excavator: L. Nehmé). It yielded only small fragments suggesting a date in the 1st century AD: notably a fine ware body sherd with ‘2-red-lines’ decor (60304_P02).

Late Byzantine – Early Islamic Pottery: a selection from the Urban Centre

A selection of pottery sherds, vessel forms and decoration patterns from the “Byzantine” / “Late Byzantine” – “Early Islamic”¹¹ periods will be presented here. The largest accumulation of pottery from this period was excavated in the “Urban centre”, in Area 1, mainly during the 2008 season. No significant stratigraphy for this time range was yet found, all “Late” pottery was excavated more or less beneath the surface. Two relevant *loci* with a selection of sherds are listed below:

Locus 10016

General date suggestion of this *locus*: a lot of storage jars with very local features such as jar form and decoration which are, at the current stage of research, not helpful for precise dating. The cooking pots and jars with their specific kind of decoration pattern may indicate a time range of Late Byzantine / transitional period. At other locations, this pottery style would be dated to the 6th – early to first half of the 7th century AD. There are features, such as shallowly incised rounded wavy lines, flat/shallow ribbing on the exterior, etc., which are known from the Late Byzantine / transitional / Early Islamic period(s). One body sherd of a small vessel with flat ribbing on the exterior and light brown fabric may even be of Early Islamic (Late Umayyad – Early Abbasid) period (10016_P04, fig. 54, see below).

- 10016_P03 (figs 55 & 56): body sherd, jar, shoulder slightly ribbed. With 2 rows of incised rounded wavy lines between two incised horizontal lines each.

Exterior: light grey to yellowish; *core*: light red; undetermined if local or not.

Date: Late Byzantine / transitional – Early Islamic (?).

Parallels: mainly decoration concept:

- Jabal Hârûn (Gerber 2008, p. 303, fig. 7.164; 6th-early 9th; p. 306, fig. 8.168; 6th-10th);
- Khirbet adh-Dharîh: Waliszewski 2001, p. 103, fig. 4.4, 6: mid-6th-beginning 9th).

- 10016_P04 (fig. 57): body sherd, rather thick-walled, of a jar/jug, with very flat, angular ribbing alternating with flat grooves on the shoulder.

Exterior: yellowish; *interior*: yellowish; *core*: light brown, with a few white and grey inclusions; imported.

¹¹ For using the terms “Byzantine”, “Late Byzantine”, “transitional” and “Early Islamic” and their possible time ranges, see discussion above.

Date: based on ribbing and fabric, Early Islamic (?).

Parallels: –

- 10016_P05 (figs 58 & 59): rim, jar, with straight rim and slightly enlarged, flat lip; incised horizontal lines on neck and upper part of the shoulder, incised “inclined” wavy lines on the shoulder.

Exterior: whitish-greenish; *Interior:* light grey; *core:* pale brown; most probably local.

Date: based on rim form and decoration, transitional – Early Islamic (?).

Parallels: no exact parallels known but based on “common concept” of jar rim forms¹² (in this case: straight or slightly outcurving rims), an Early Islamic date may be suggested.

- 10016_P06 (figs 60 & 61): fragment, lamp, of round shape, irregularly made and worn, no handle; the small rounded nozzle is blackened and broken; incised decoration, stylised palm, between filling-hole and nozzle.

Exterior: pinkish-white; *core:* light reddish brown, with white inclusions; local production.

Date: based on context

Parallels: no parallels known.

- 10016_P14 (figs 62 & 63): rim-base (complete profile), cooking pot, with inverted neck, short, everted rim and thinned lip; very flat, angular ribbing alternating with small grooves on the carinated shoulder; 2 handles attached to rim and shoulder, with very flat, oval section.

Exterior: reddish brown, blackened; *core:* light red; undetermined provenience.

Date: Late Byzantine / transitional – Early Islamic (?).

Parallels: no exact parallels known; the carinated cooking pot profile and the very flat handle sections are not typical for Byzantine forms, but may suggest most probably an Early Islamic date (?).

- 10016_P18 (figs 64 & 65): rim / half profile, storage jar, with inverted side-wall/neck, inverted rim and rounded lip. Its profile is “dull”, not showing any differentiation between rim, neck, shoulder and body; traces of 1 handle preserved, attached to the upper part of the body; 1 row of incised, rounded wavy lines on the exterior of the rim, another row on the “not existing” shoulder; below 4 rows of incised pointed wavy lines (zig-zag).

Core: pink to greenish, with white and light red inclusions; local.

Date: based on the context, Late Byzantine / transitional – Early Islamic?

Parallels: no parallels known.

- 10016_P20 (figs 66 & 67): rim-base (complete profile), storage jar, with short, inverted rim and very slightly inward-slanting lip, round base; a clay strip with finger-impressions on the exterior of the lower part of the rim; the jar might have had originally 4 handles, with flat oval section with 1 ridge on the upper side, the handles go from the clay strip to the lower part of the shoulder.

Exterior: whitish-greenish; *core:* pale brown; local.

¹² Gerber 2008, p. 288.

Date: based on the context, Late Byzantine / transitional – Early Islamic?

Parallels: no exact parallels known but based on “common concept” of storage jar (rim) forms (in this case: inverted rim and slightly inward-slanting lip; 4 handles), a date of Early Islamic period may be suggested. The decoration type (clay strip with finger-impressions) is quite common in this period, but not necessarily on storage jars.¹³

Locus 10048

General date suggestion of this *locus*: the pottery material in this *locus* is not homogeneous, partially from Late Hellenistic period – 1st/early 2nd century AD, and partially from Byzantine period¹⁴.

- 10048_P01 (fig. 68 & fig. 69): base / 3/4 profile, storage jar, with round base, flat ribbing on the exterior; 3 handles, with oval section; small clay strips with finger-impressions (length: *c.* 5 cm) on the upper part of the shoulder between the handles, below 2 rows of incised rounded wavy lines between 2 rows of incised, horizontal lines each on the shoulder and above the ribbing.

Exterior: white; *core*: light red, with sandy inclusions; local.

Date: based on decoration, Late Byzantine / transitional (?).

Parallels: mainly decoration concept:

- Jabal Hârûn: Gerber 2008, p. 292, fig. 2.29 (Byzantine?); p. 303, fig. 7.164 (6th–early 9th); p. 306, fig. 8.168 (6th–10th);
- Khirbet adh-Dharîh (Waliszewski 2001: p. 103, fig. 4.4, 6; mid-6th–beginning 9th).

Bibliography

- ‘Amr and Schick 2001: ‘Amr Kh. and Schick R., “The Pottery of Humeima: The Closed Corpus from the Lower Church”, in E. Villeneuve and P. Watson (eds), *La céramique byzantine et proto-islamique en Syrie-Jordanie (IV^e-VIII^e siècles apr. J.-C.)*. Actes du colloque tenu à Amman les 3, 4 et 5 décembre 1994, Beyrouth: Bibliothèque Archéologique et Historique 159, p. 107-127.
- Durand and Gerber 2009: Durand C. and Gerber Y., “Pottery Study”, in L. Nehmé, D. al-Talhi and F. Villeneuve (eds), *Hegra I. Report on the First Excavation Season at Madâ’in Sâlih, Saudia Arabia, 2008*, Riyadh: Saudi Commission for Tourism and Antiquities, p. 283-298.
- Gerber 2001: Gerber Y., “A Glimpse of the Recent Excavations on ez-Zantur/Petra: The Late Roman Pottery and its Prototypes in the 2nd and 3rd Centuries AD”, in E. Villeneuve and P. Watson (eds), *La céramique byzantine et proto-islamique en Syrie-Jordanie (IV^e-VIII^e siècles apr. J.-C.)*. Actes du colloque tenu à Amman les 3, 4 et 5 décembre 1994, Beyrouth: Bibliothèque Archéologique et Historique 159, 2001, p. 7-12.
- Gerber 2008: Gerber Y., “The Byzantine and Early Islamic Pottery From Jabal Harun”, in Z. T. Fiema *et al.* (eds), *Petra – The Mountain of Aaron. The Finnish Archaeological Project in Jordan, Vol. I: The*

¹³ Jabal Hârûn (Gerber 2008: p. 293, fig. 3.52; decoration type of this basin mid-7th–mid-8th; p. 301, fig. 6.123-124; 6th–8th); Khirbet adh-Dharîh (Waliszewski 2001, p. 105, fig. 6.9; mid-6th–beginning 9th); Humeima (‘Amr and Schick 2001, p. 121, fig. 6.10 (this decoration on a dolium rim); mid-7th).

¹⁴ This locus is not a floor but a destruction layer which lies above a floor which was excavated in 2009. The pottery it contains does therefore not date the latest occupation of the house. 10048_P01 probably fell from the roof of the house.

- Church and the Chapel*, Helsinki: Societas Scientiarum Fennica, p. 287-310.
- MacDonald 1992: MacDonald B., *The Southern Ghors and Northeast 'Arabah Archaeological Survey*, Sheffield: Sheffield Archaeological Monographs 5.
- Peacock 1986: Peacock D. P. S., *Amphorae and the Roman economy: an introductory guide*, London: Longman archaeology series.
- Schmid 1996: Schmid S. G., "Die Feinkeramik", in A. Bignasca *et al.* (eds), *Petra, Ez Zantur I. Ergebnisse der Schweizerisch-Liechtensteinischen Ausgrabungen 1988-1992*, Mainz: Terra Archaeologica 2, p. 151-172.
- Schmid 2000: Schmid S. G., "Die Feinkeramik der Nabatäer. Typologie, Chronologie und kulturhistorische Hintergründe", in S. G. Schmid and B. Kolb (eds), *Petra, Ez Zantur II. Ergebnisse der Schweizerisch-Liechtensteinischen Ausgrabungen*, Mainz: Terra Archaeologica 4, p. 1-199.
- Waliszewski 2001: Waliszewski T., "Céramique byzantine et proto-islamique de Khirbet edh-Dharieh", in E. Villeneuve and P. Watson (eds), *La céramique byzantine et proto-islamique en Syrie-Jordanie (IV^e-VIII^e siècles apr. J.-C.)*. Actes du colloque tenue à Amman les 3, 4 et 5 décembre 1994, Beyrouth: Bibliothèque Archéologique et Historique 159, 2001, p. 95-106.



Fig. 1. Sherd 10146_P06



Fig. 2. Sherd 10133_P01



Fig. 3. Sherd 10133_P02



Fig. 4. Sherd 10146_P03



Fig. 5. Late Byzantine / transitional period complete vessel, 10158_P01



Fig. 6. Nabatean fine ware bowl with two red, parallel wavy lines in its interior, 10124_P01.

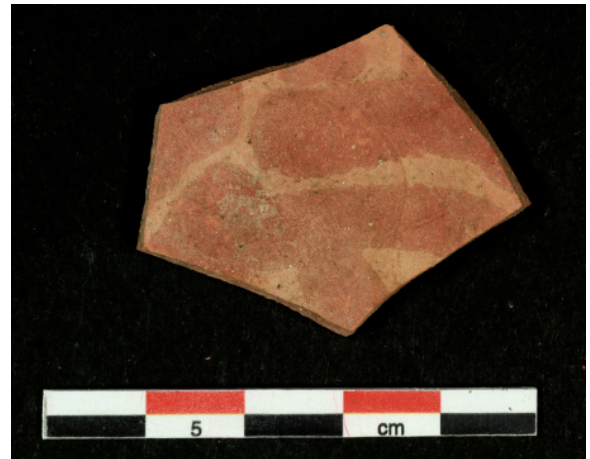


Fig. 7. Nabatean fine ware round base with red decor, 10124_P02



Fig. 8. Rim sherd of a Nabatean fine ware bowl (Schmid's group 6 of unpainted bowls), second half of the 1st century BC – first quarter of the 1st century AD, 22101_P03

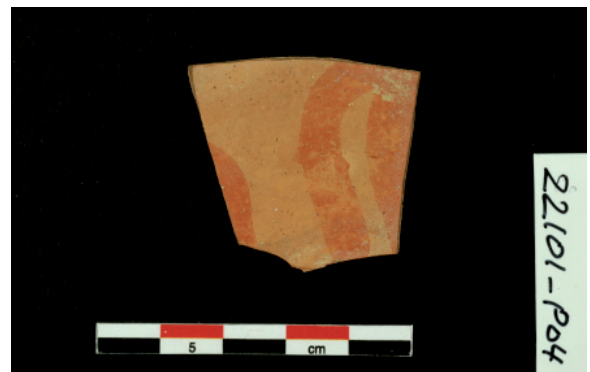


Fig. 9. Nabatean fine ware bowl with '2-red-lines' decor in its interior, 22101_P04



Fig. 10. Nabatean fine ware bowl with small red lines on the interior of the rim, 25003_P11



Fig. 11. Nabatean fine ware bowl with '2-red-lines' decor in its interior, 25021_P01



Fig. 12. Late Hellenistic jar, 25003_P03



Fig. 13. Early Roman jar, 25031_P01



Fig. 14. Early Roman cooking pot, 25033_P01



Fig. 15. Late Hellenistic – Early Roman common ware bowl, 25003_P08



Fig. 16. Late Roman pot, 25004_P09



Fig. 17. Late Roman cooking pot, 25004_P12



Fig. 18 . Late Roman cooking pot, 25006_P01



Fig. 19. Roman – Late Roman jar, 25017_P02



Fig. 20. Late Roman juglet, 25015_P01



Fig. 21. Late Roman bowl, 25015_P04

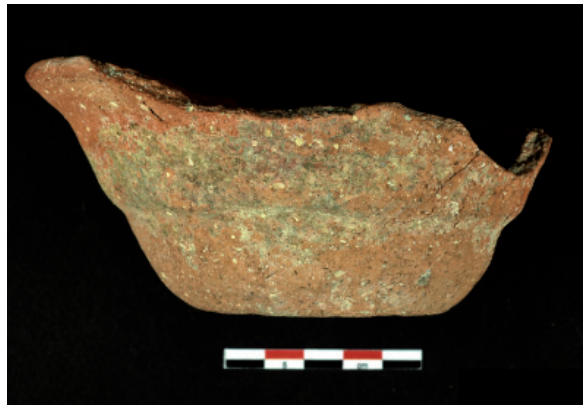


Fig. 22 Late Roman bowl, 25017_P01



Fig. 23. Late Roman bowl, 25023_P01



Fig. 24 Late Byzantine / transitional period cooking pot, 25007_P01



Fig. 25. Late Roman common ware bowl with internal painting, 25008_P03



Fig. 26. Internal painting of the same, 25008_P03



Fig. 27. Late Roman painted common ware bowl imported from Petra, 25015_P16



Fig. 28. Nabatean fine ware sherd with the '2-red-lines' decor in its interior, 23001_P08



Fig. 29. Glazed handle with flat section, most probably of a so-called "Parthian" jug, 23017_P01.



Fig. 30. Late Hellenistic – Early Roman jar imported from Petra, 23004_P06

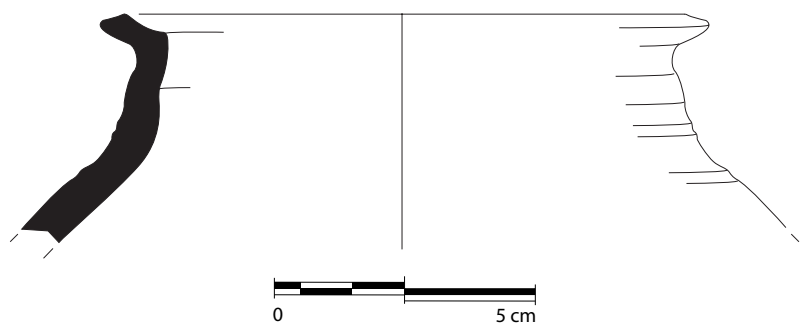


Fig. 31. Drawing of 23004_P06



Fig. 32. (Late) Hellenistic jar rim form, 23005_P02



Fig. 33. Late Hellenistic – Early Roman local pithos, 24007_P01

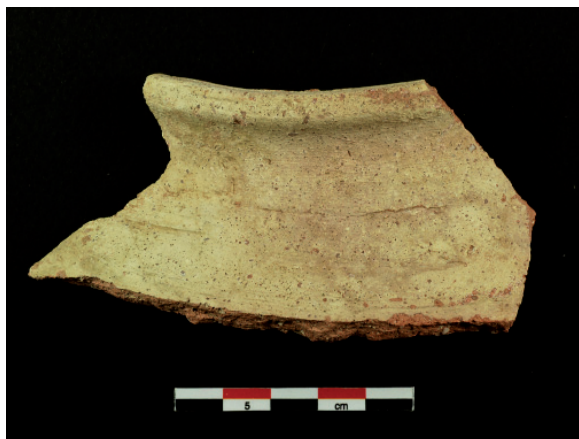


Fig. 34. 1st century AD jar, 70008_P02



Fig. 35. Late Roman / Byzantine (?) cooking pot probably imported from Petra, 70009_P05



Fig. 36. Byzantine (?) jar, 70004_P02



Fig. 37. Byzantine (?) jar, 70009_P04



Fig. 38. Handle of an imported amphora (Peacock Class 47 ("Kapitän II")) with a red fabric and large dark grey inclusions, 70009_P01



Fig. 39. Byzantine/Late Byzantine cooking pot, 80014_P02



Fig. 40. Cooking pot with incised rounded wavy lines crossing each other between two bunches of incised horizontal lines on its shoulder, 80022_P02



Fig. 41. Late 1st/2nd century AD cooking pot imported from Petra, 80003_P03



Fig. 42. Upper side of a lamp, 80017_P01



Fig. 43. Sherd of a 1st century AD jar with pinched rim, 32033_P01



Fig. 44. Sherd of a jar with pinched rim typical of the 1st century, 32102_P02



Fig. 45. Sherd of a jar with pinched rim typical of the 1st century, 32105_P05

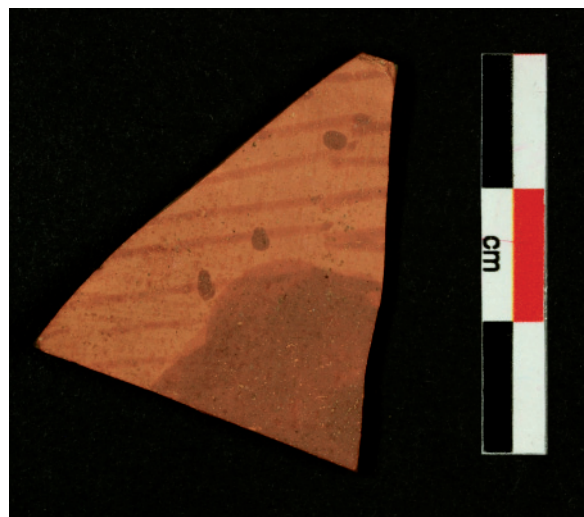


Fig. 46. Nabatean fine ware body sherd (probably Schmid's phase 3a), 50206_P01

Fig. 47. Sherd of a globular Nabatean fine ware juglet with ring base and rouletted pattern on its exterior, imported from Petra, 50120_P01



Fig. 48. Drawing of 50120_P01

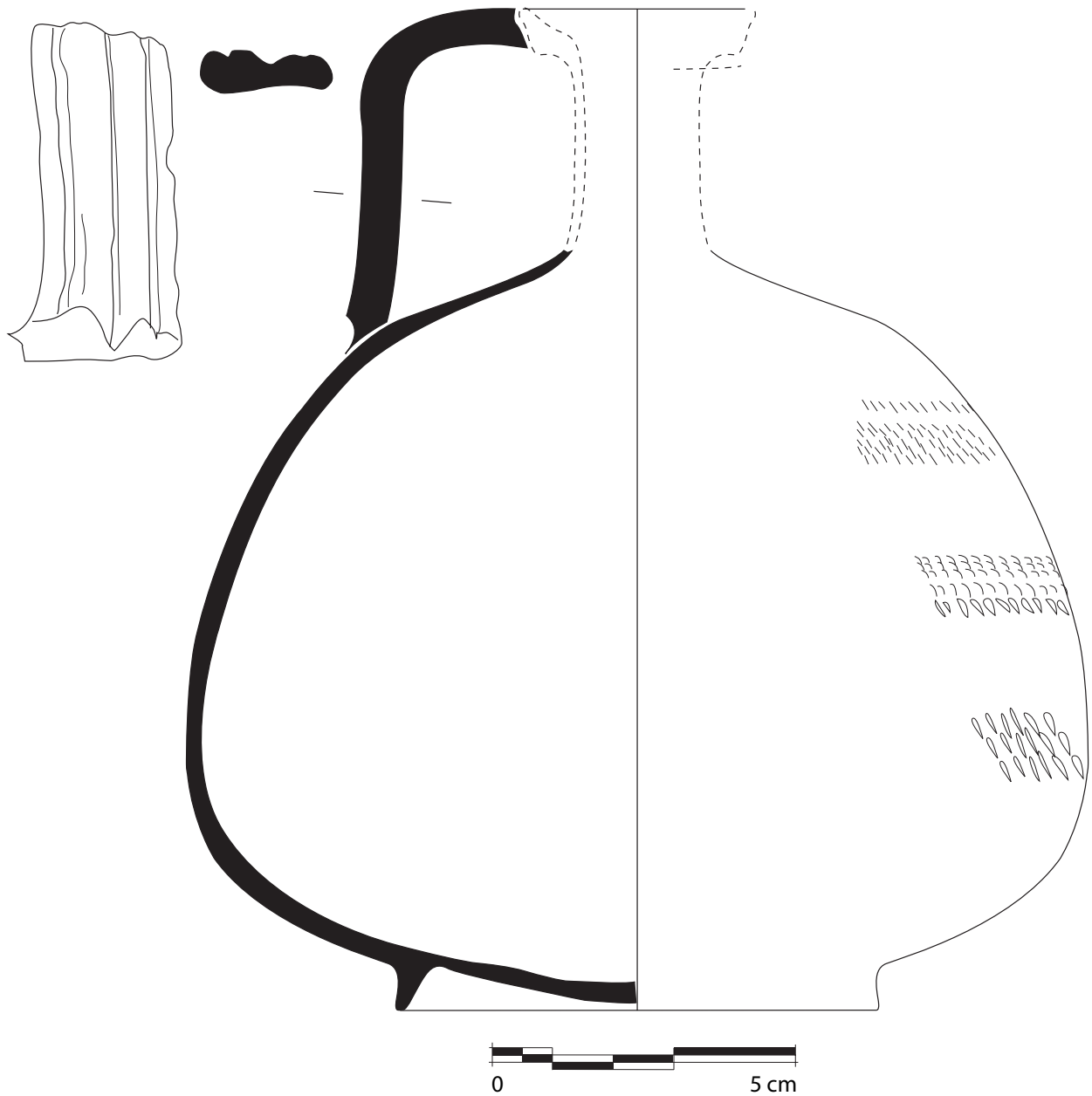




Fig. 49. Glazed jug, of the so-called “Parthian” fabric, 50110_P01

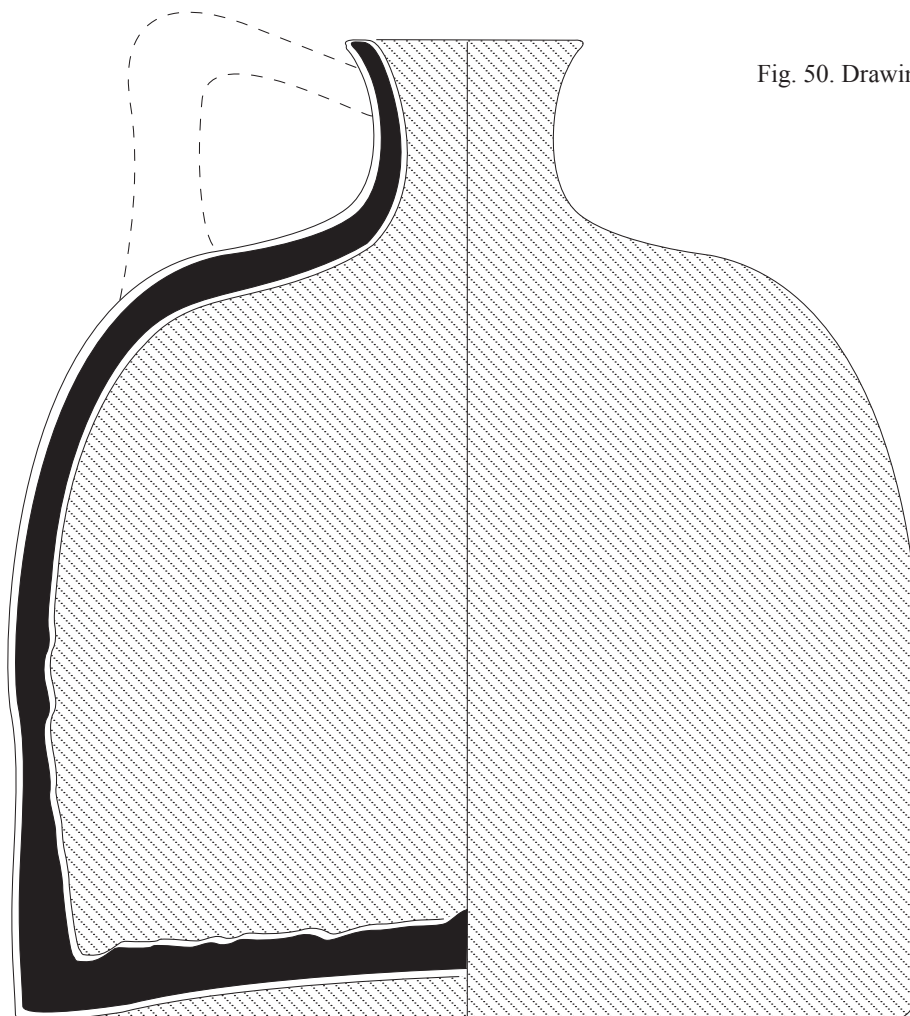


Fig. 50. Drawing of 50110_P01





Fig. 51. Ring base of a jar, imported from Petra,
50180_P01



Fig. 52. Sherds belonging to 50220_P01



Fig. 53. Common ware bowl of local fabric, 50108_P01



Fig. 54. Late Umayyad – Early Abbasid (?) body sherd, 10016-P04.

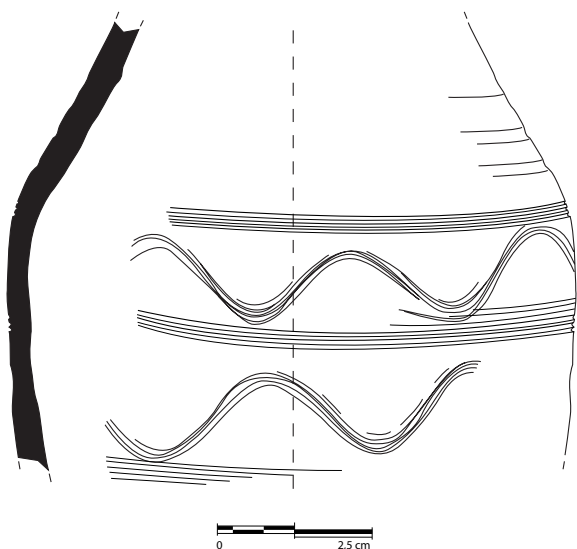


Fig. 55 Drawing of 10016_P03



Fig. 56. Body sherd of a Late Byzantine / transitional – Early Islamic (?) jar, 10016_P03.

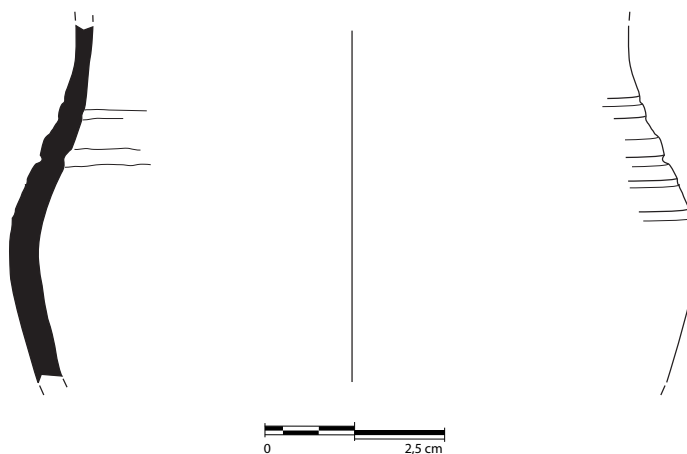


Fig. 57. Drawing of 10016_P04

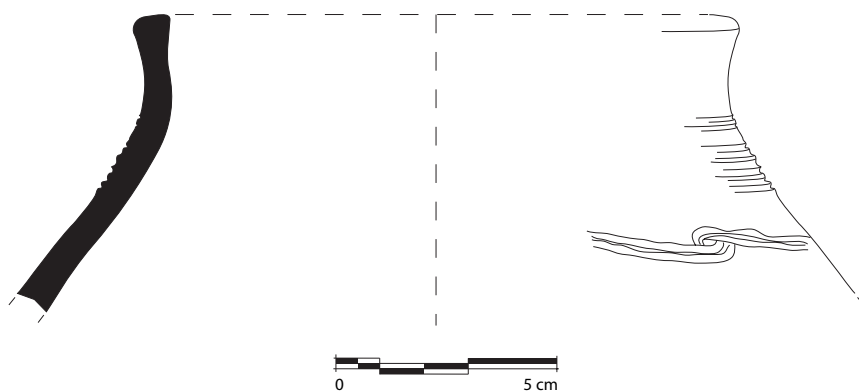


Fig. 58. Drawing of 10016_P05



Fig. 59. Rim of a transitional – Early Islamic (?) jar, 10016_P05

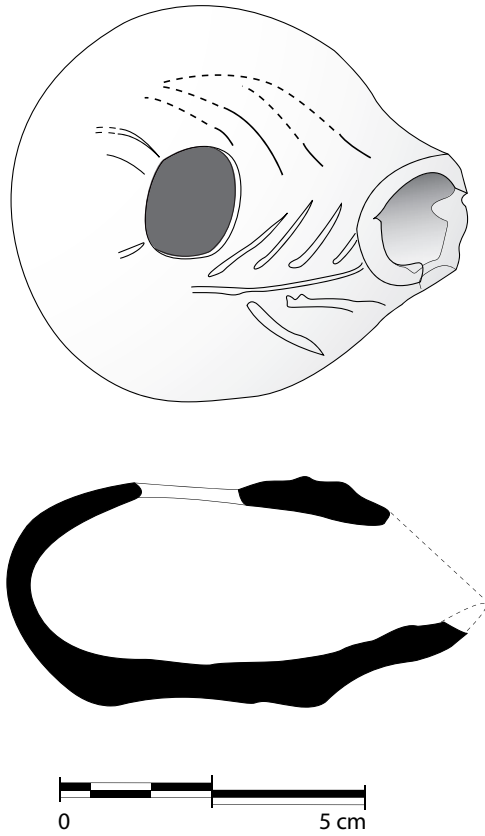


Fig. 60. Drawing of 10016_P06



Fig. 61. Fragment of a lamp, 10016_P06

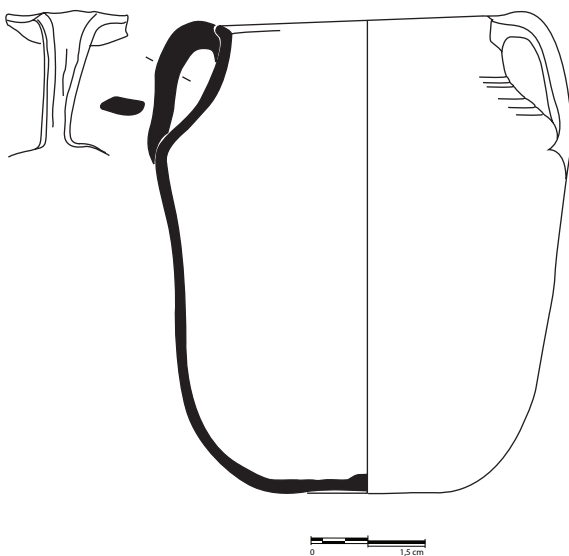


Fig. 62. Drawing of 10016_P14



Fig. 63. Late Byzantine / transitional – Early Islamic (?) cooking pot, 10016_P14

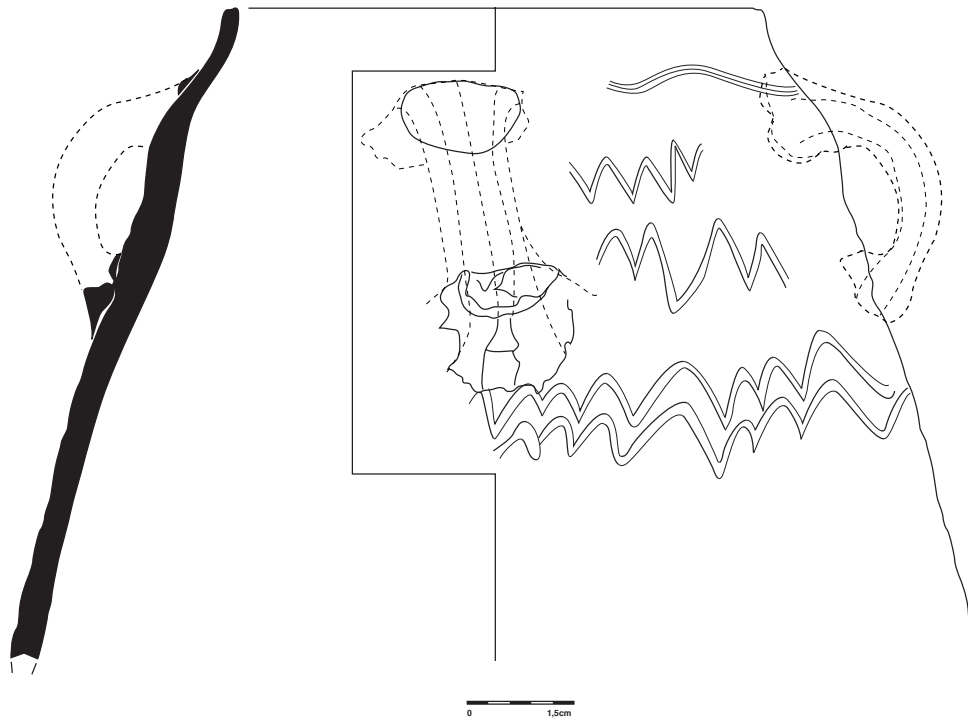


Fig. 64. Drawing of 10016_P18



Fig. 65. Sherd of a Late Byzantine / transitional – Early Islamic (?) storage jar, 10016_P18.

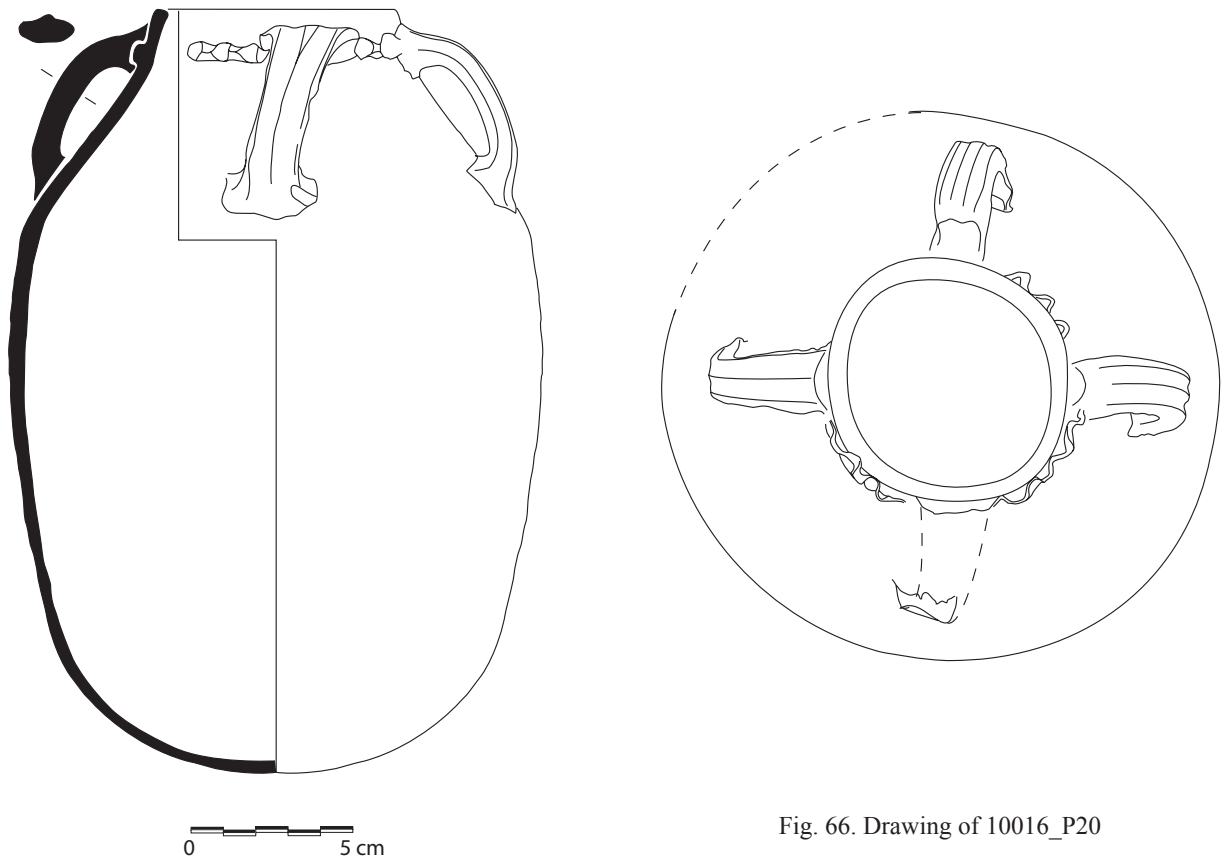


Fig. 66. Drawing of 10016_P20



Fig. 67 Late Byzantine /
transitional – Early Islamic
(?) storage jar, 10016_P20

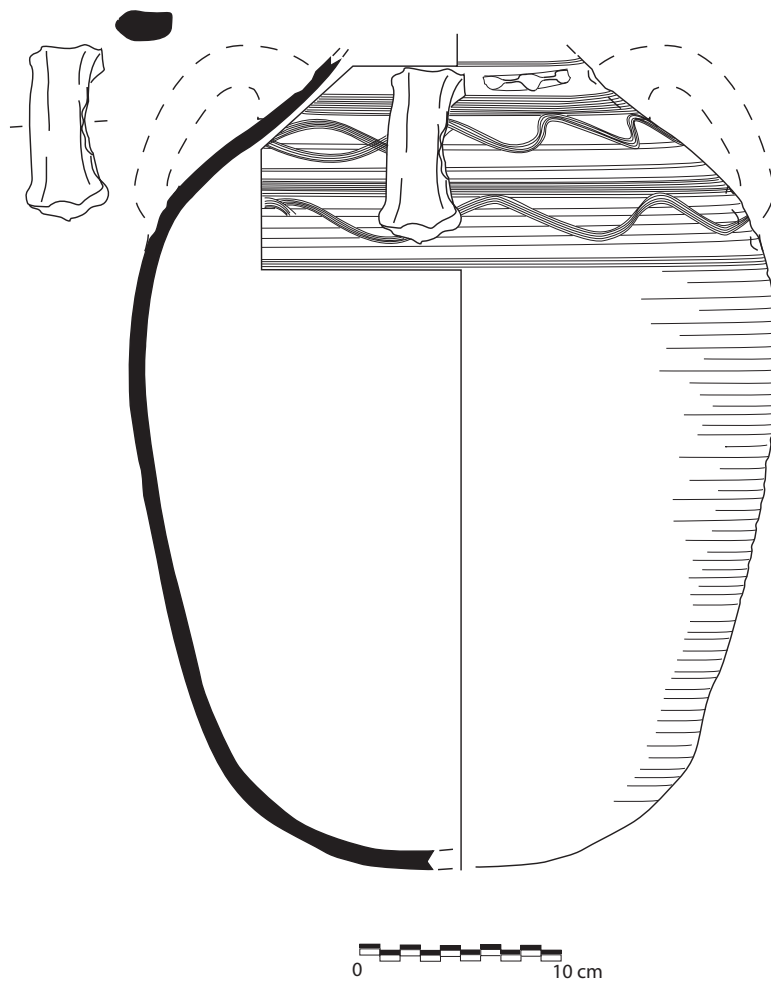


Fig. 68 Drawing of 10048_P01



Fig. 69 Late Byzantine / transitional
(?) storage jar, 10048_P01

Conclusion

Conclusion

The contributions presented in this report bear witness to the dynamism of the Archaeological Project in Madâ'in Sâlih with regard to the variety of excavations undertaken in the residential area and elsewhere and to the studies which are made on the various categories of artefacts. This report is deliberately complete so that each member of the project can see the reports on all the other member's work and so that the documentation which will be used for the final report is gathered year after year.

Considering what was done in 2009, the operations which are scheduled in 2010 are the following: 1/ continuation of the excavations in areas 1, 2, 7 and 8 and topographical mapping of segments of the rampart in its southern part (area 3); 2/ sounding in the southeastern part of the residential area, where the sediments seem to be thicker; 3/ excavation of the tell formed par the hillock IGN 132 and the structures which surround it. Most of the operations will therefore be undertaken in the residential area. Indeed, the excavation of tomb IGN 117, which should have been scheduled in 2010, will not take place because the archaeologist in charge is on maternity leave. It will have to be postponed until 2011.

The intervention of two new specialists, on top of those who have already worked for the project, a geomorphologist (E. Fouache, University of Paris 10) and an archaeozoologist (J. Studer, Natural History Museum of Geneva) are also scheduled in 2010. Finally, a geophysical detection, complementary of that made by A. Kermorvant from 2002 to 2005, will be made by Chr. Benech (CNRS). The resolution which can now be obtained (one point every 10 cm) is indeed much higher than that of the image produced by A. Kermorvant (one point every meter). It therefore seemed useful to make a further attempt of geophysical detection in an area of the city which was not yet surveyed.

Other operations (on another tumulus, on a tomb belonging to the first phase of occupation and in a well) will be undertaken during the last year of the four years research programme, in 2011.

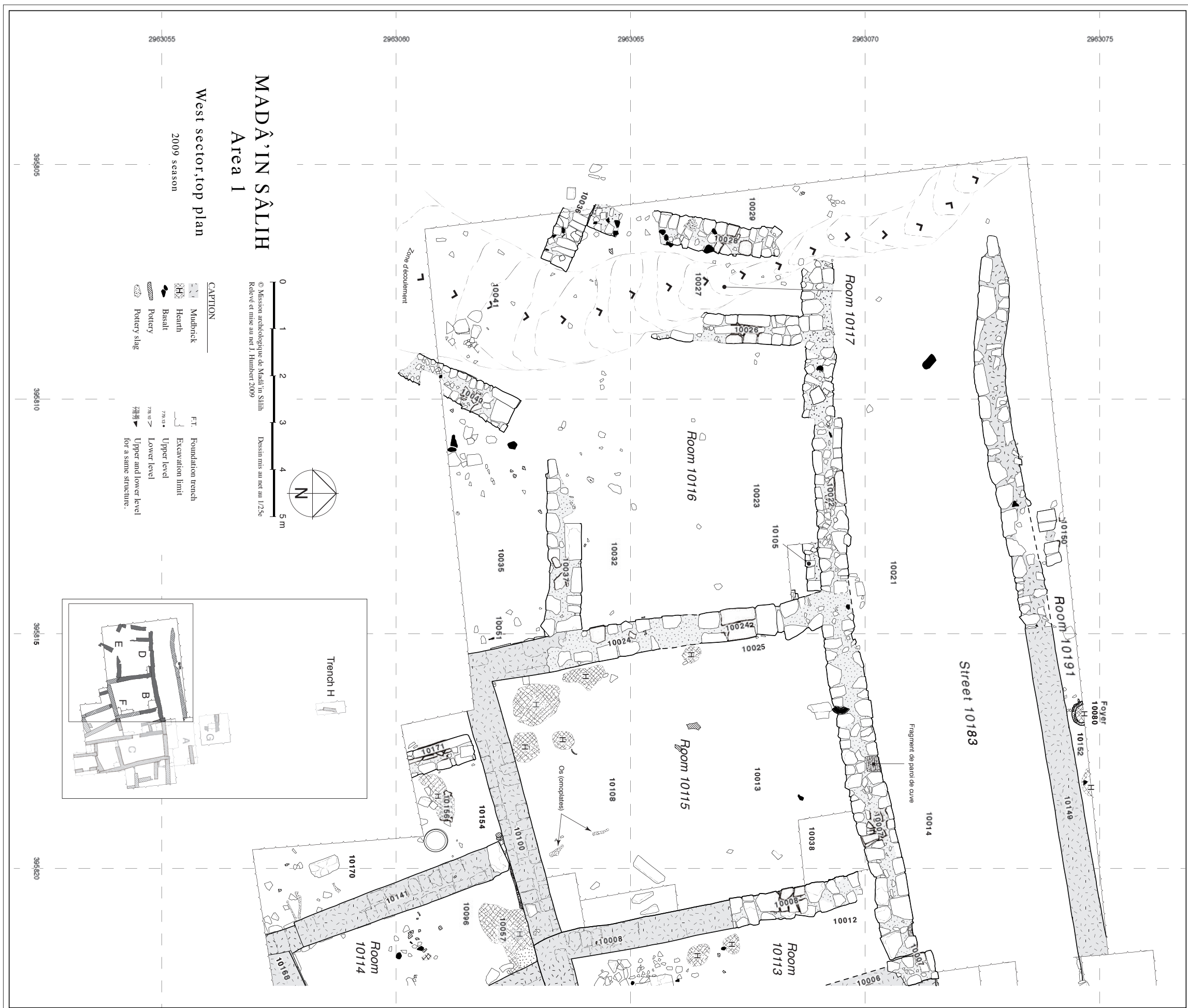


Fig. 2. General plan of Area 1

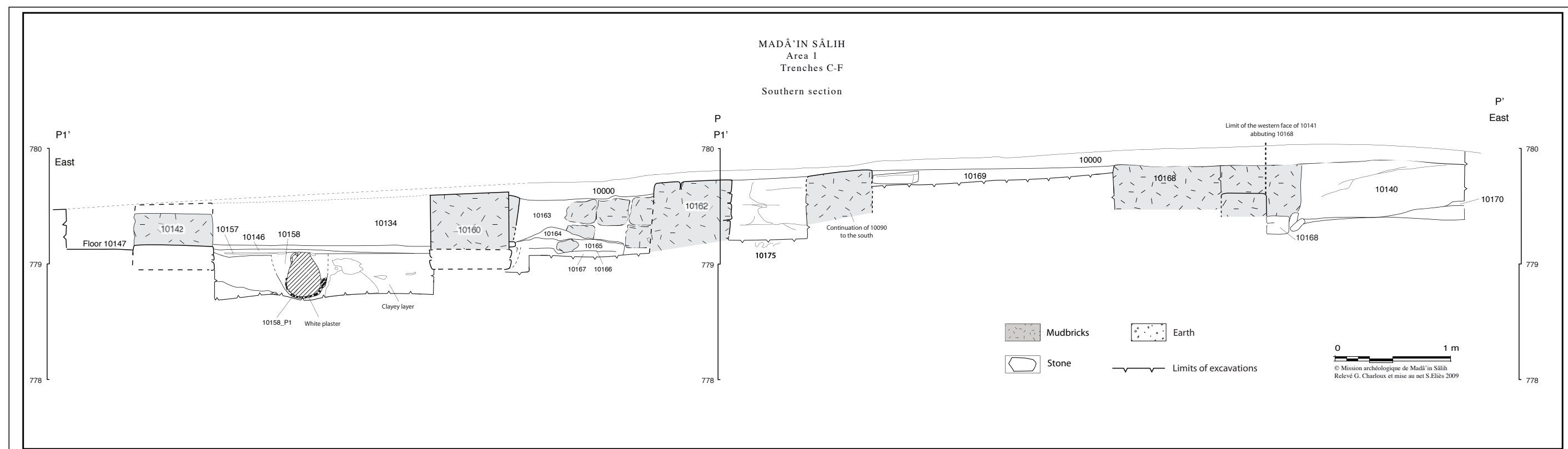


Fig. 9. Trenches C and F, southern section

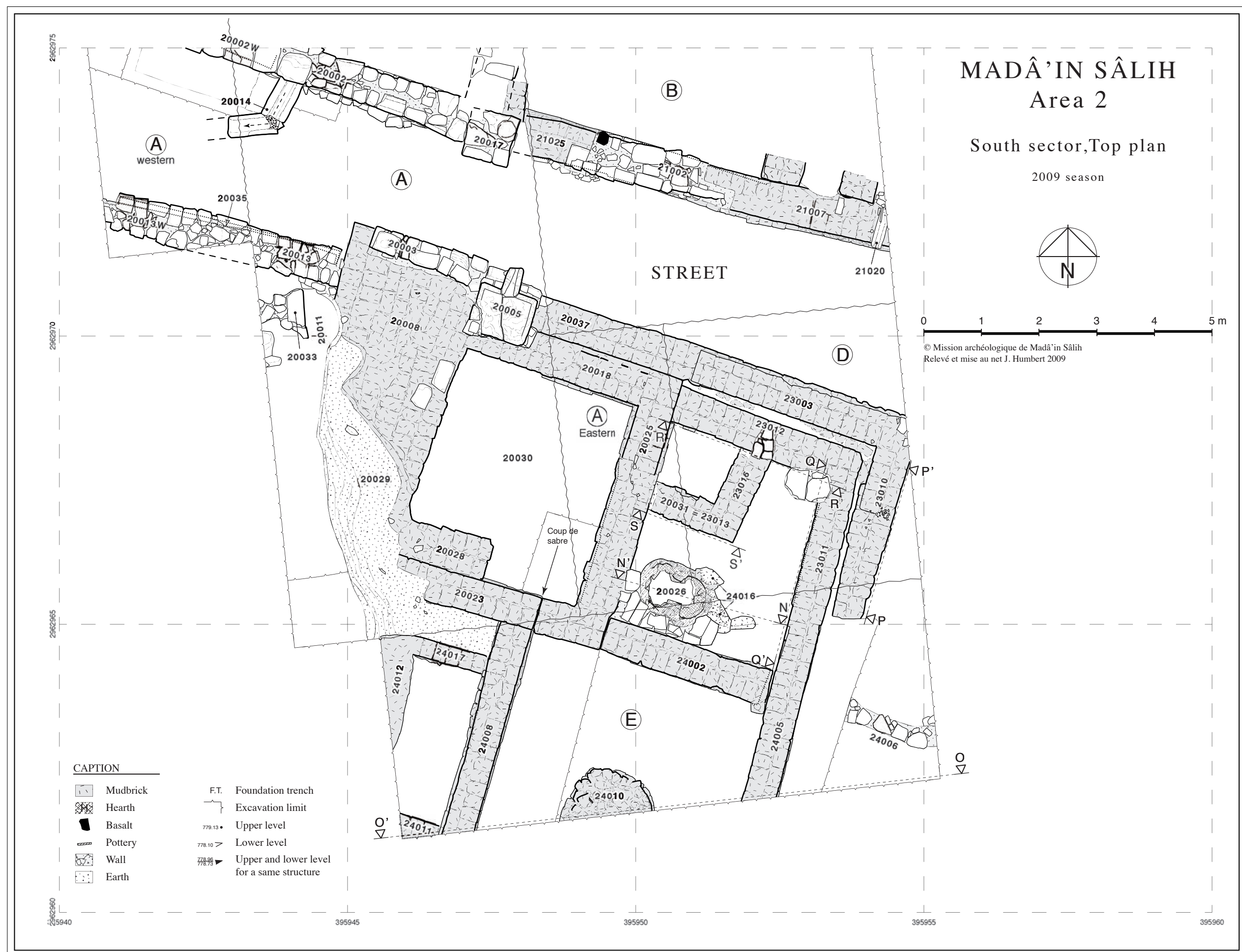


Fig. 1. General plan of Area 2 after the 2009 season

2962985

2962980

2962975

2962970

395940

395945

395950

395955

395960

MADÂ'IN SÂLIH Area 2

North sector, Top plan

2009 season



0 1 2 3 4 5 m

© Mission archéologique de Madâ'in Sâlih
Relevé et mise au net J. Humbert 2009

CAPTION

- | | | | |
|--|----------|--|--|
| | Mudbrick | | F.T. Foundation trench |
| | Hearth | | Excavation limit |
| | Basalt | | Upper level |
| | Pottery | | Lower level |
| | Mortar | | Upper and lower level for a same structure |
| | Wall | | |
| | Earth | | |



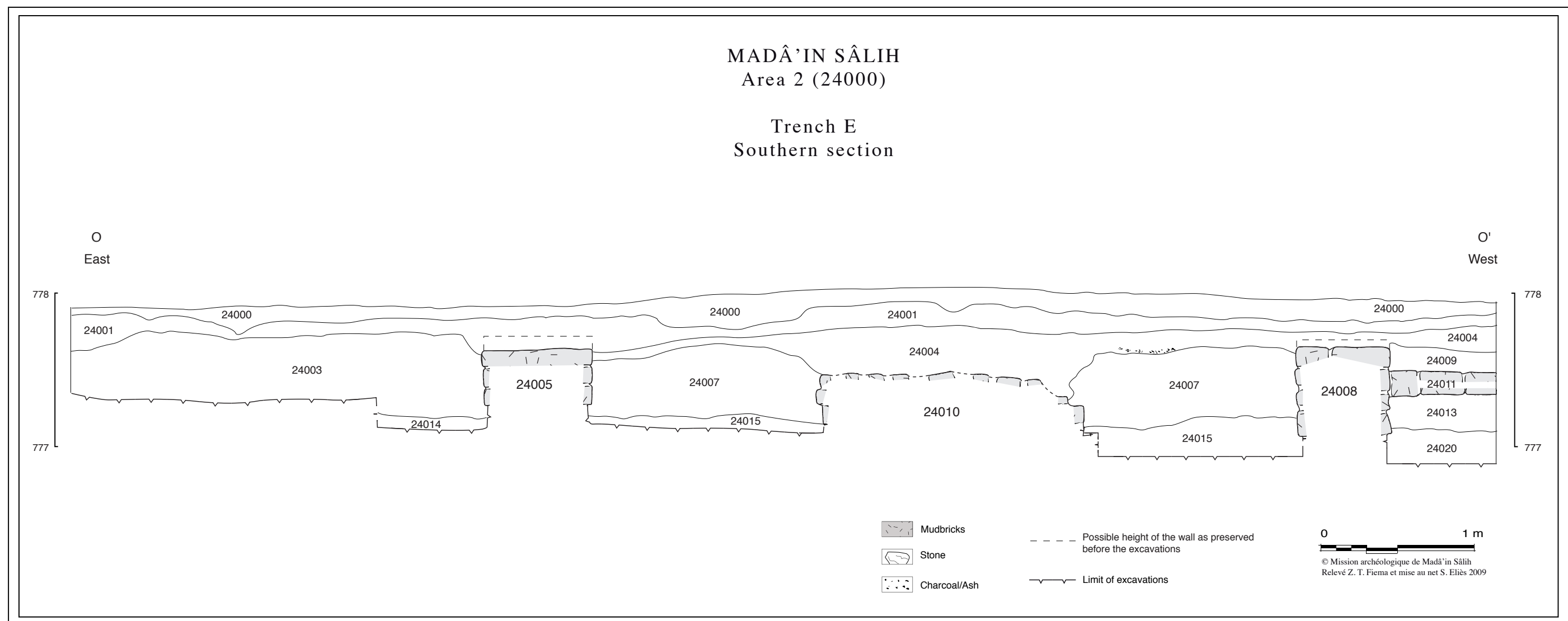


Fig. 2. Trench E, southern section

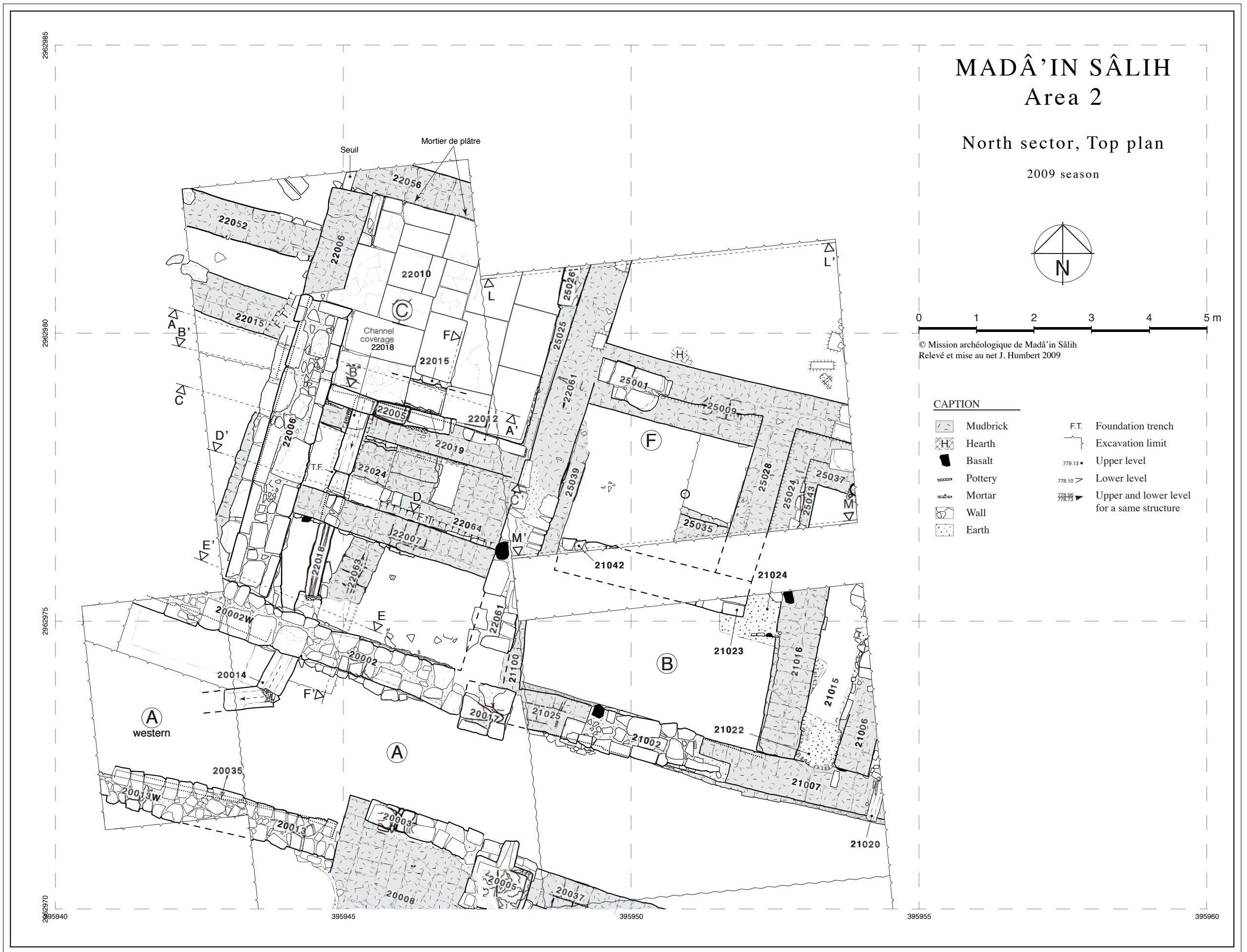


Fig. 1. General top plan

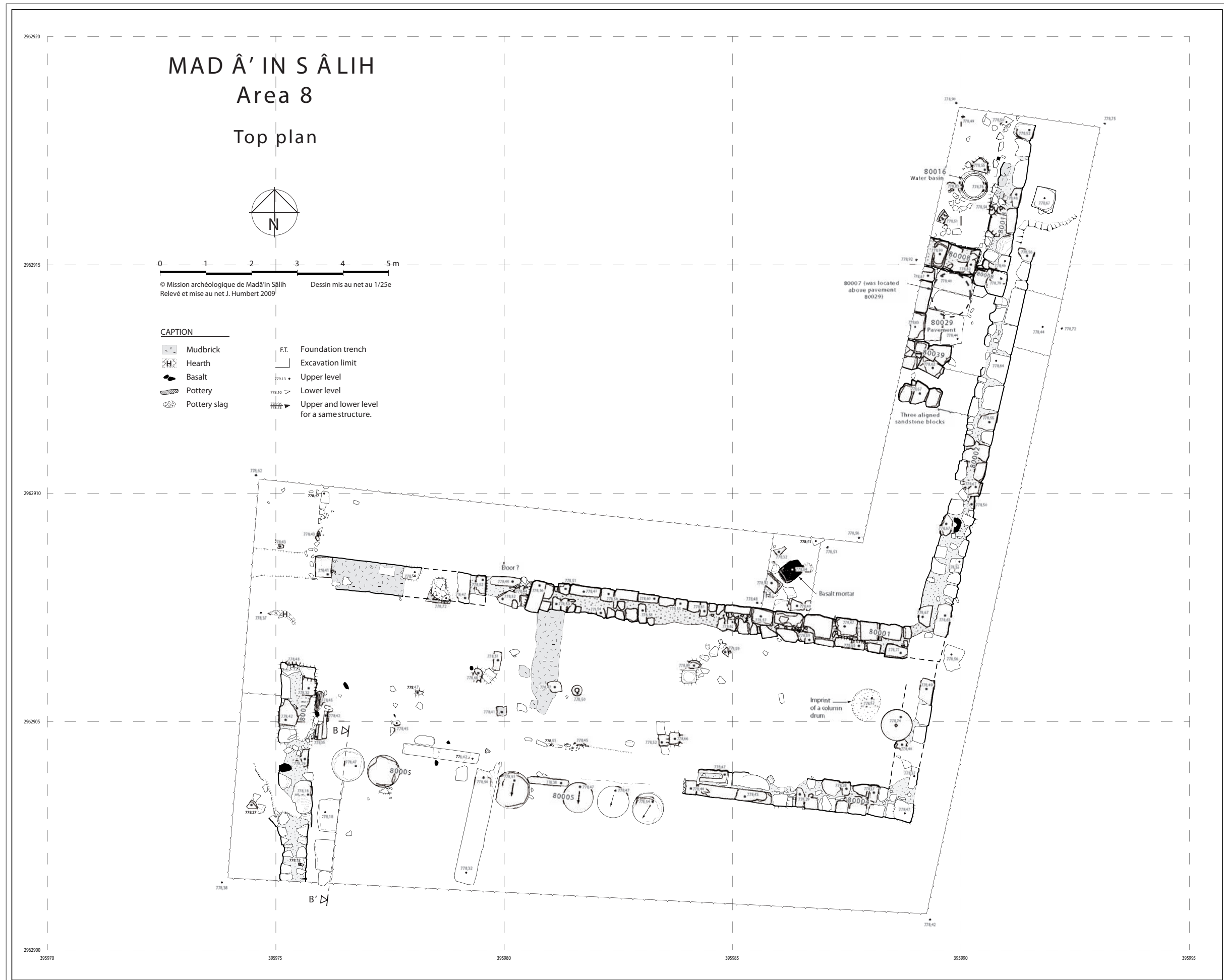


Fig 4. General plan

Appendix B